

SR 283/230 Corridor Study

*Achieving a Sustainable Future for the
SR 283 and SR 230 Corridors*

FINAL REPORT



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Prepared for: Lancaster County Planning Commission (LCPC) &
Economic Development Company of Lancaster County (EDC)

Prepared by: Whitman, Requardt & Associates, LLP (WRA)



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BACKGROUND

INTRODUCTION

STUDY PURPOSE

The SR 283/230 Corridor Study was initiated jointly by the Lancaster County Planning Commission (LCPC) and Economic Development Company of Lancaster County (EDC). The goal of the study is to develop a framework for Lancaster County to address economic development and land use management challenges along State Routes (SR) 283 and 230. Specific objectives of the study included:

- Enhance county and municipal approaches to managing commercial, industrial, and residential land uses in the corridors to the mutual and reinforcing benefit of all uses and communities by considering existing land use, zoning, and potential zoning changes;
- Determine transportation investments that are needed to improve the viability of the corridor through a balanced approach considering jobs, housing, and transportation; and
- Implement a regionally agreed upon approach that can be replicated in other parts of the County.

The need for this study originated out of several discussions between LCPC and EDC as they examined undeveloped parcels larger than 5 acres within the Urban Growth Areas (UGAs) to determine if some of the existing parcels were underutilized. From these discussions, three geographic focus areas were identified for analysis:

- *West Donegal/Cloverleaf Road Area:* Parcels bounded by SR 230, SR 741, and Cloverleaf Road and parcels in the northeast corner of the SR 283 and Cloverleaf Road Interchange.
- *Rapho Triangle/Spooky Nook Area:* Parcels bounded by SR 283, SR 230, and SR 772 and parcels in the northeast corner of the SR 283 and Spooky Nook Road Interchange.
- *East Hempfield Township Area:* Parcels bounded by SR 283, SR 722, Harrisburg Pike, and McGovernville Road.

STUDY AREA

The SR 283/230 study area limits include an approximately 1-mile buffer around SR 283 and SR 230 from the Dauphin County line (western limit) to the SR 283 and SR 722 / State Road interchange near Landisville (eastern limit). Only the parcels designated within Lancaster County's UGAs were analyzed as part of this study. Parcels outside of the UGAs were excluded for consistency with Lancaster County's comprehensive plan preferred land use scenario that guides the majority of new growth to the UGAs. A total of 1,300 UGA parcels were evaluated for this study, which can be viewed in [Exhibit 1](#). Current zoning in the study area can be viewed in [Exhibit 2](#).



Exhibit 1 – Parcels Within Urban Growth Areas

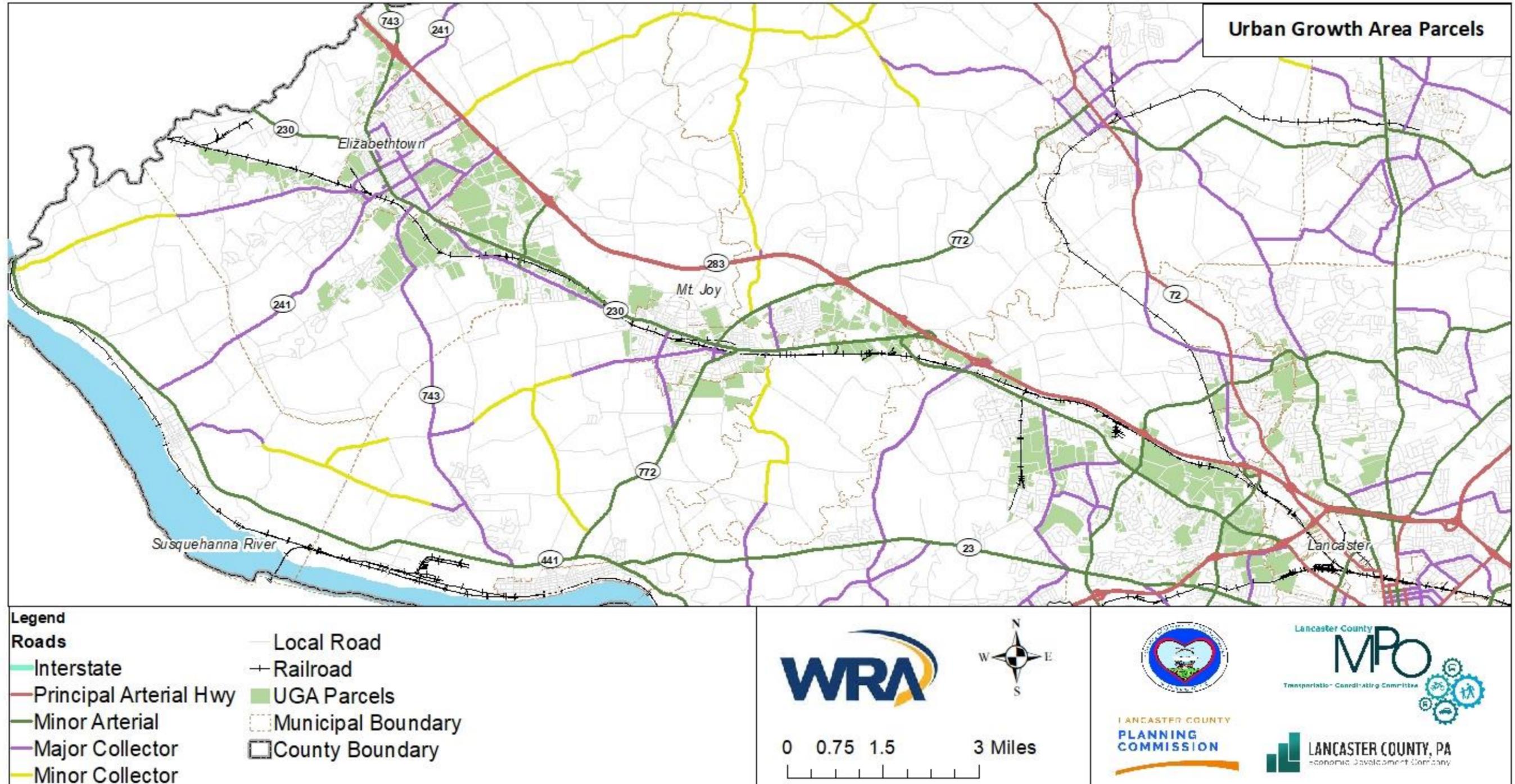
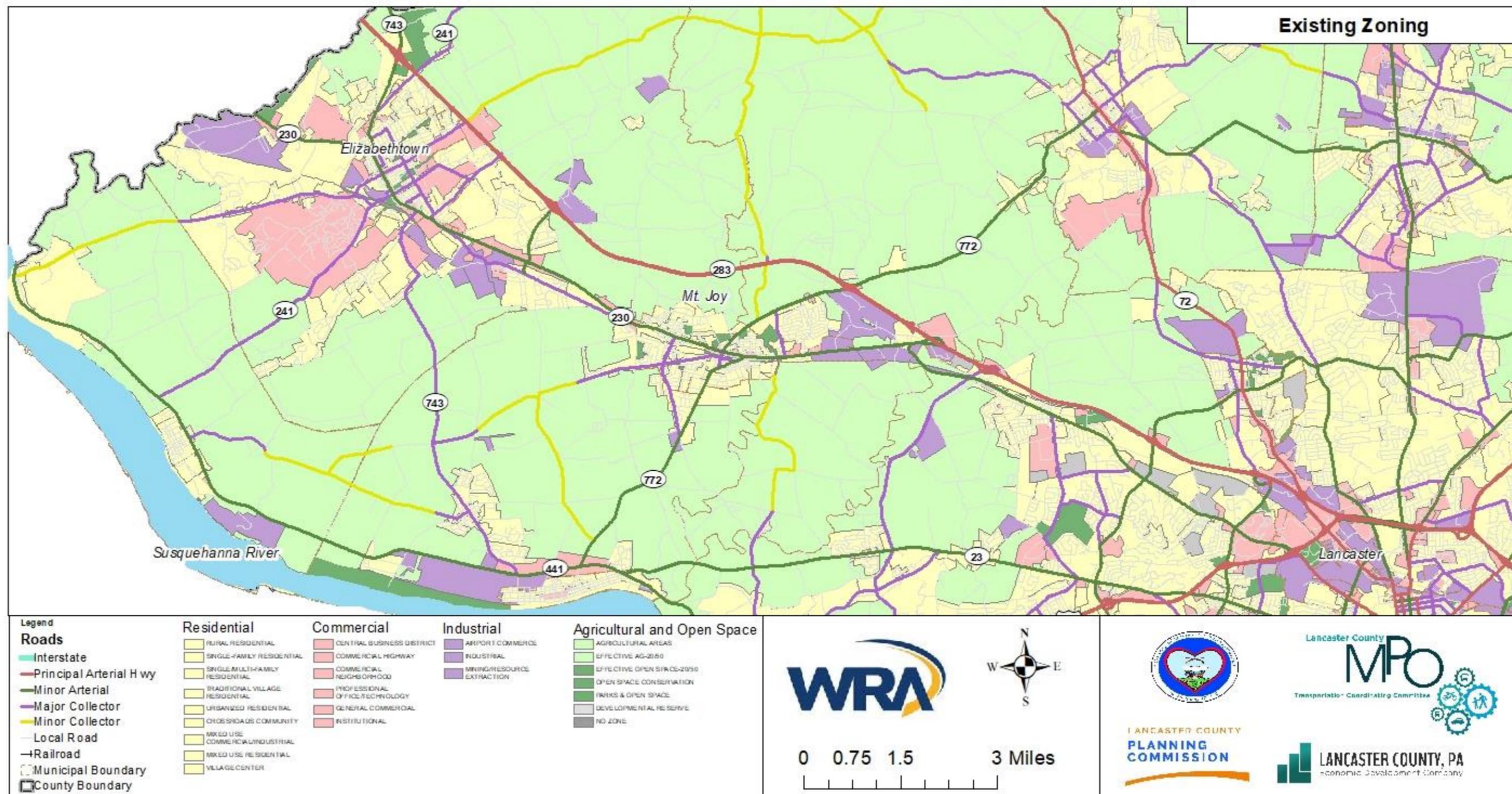




Exhibit 2 – Existing Zoning Map





PROJECT ADVISORY COMMITTEE AND STAKEHOLDER INVOLVEMENT

Local input and guidance is critical in identifying needs and opportunities, developing improvements to meet those needs, and getting improvements programmed, funded, and implemented. A Project Advisory Committee (PAC) comprised of local business owners, transportation agencies, and planning partners was consulted throughout the study along with officials from local municipalities. This diverse group of community leaders was selected to help provide a more comprehensive evaluation of current and future land use and transportation needs. PAC members represented the following organizations:

- Economic Development Company of Lancaster County
- Elizabethtown Area School District
- Lancaster County Planning Commission
- Lancaster Farmland Trust
- Lift, Inc.
- Mount Joy Borough Authority
- South Central Transit Authority
- Spooky Nook Sports
- Union Community Bank
- The Wenger Group

Stakeholder involvement included three PAC meetings and a developable land use exercise. The first meeting was used to engage the PAC to identify project success factors, areas of concern, and land use and transportation needs within the study area. The second meeting focused on determining land use and transportation metrics for four land uses (industrial, commercial, residential, and agriculture). The third meeting was used to verify parcel land use metric results and the desired analysis scenarios to guide future transportation and/or land use improvements.

EXISTING CONDITIONS

LAND USE CONTEXT

A multitude of land uses exist within the study area ranging from heavy industrial to mixed use/residential and agriculture. In most cases, land uses within the study area can be generally categorized as agricultural, commercial, industrial, and residential. Developed land is concentrated between SR 283 and SR 230 near the population centers and interchanges within the UGAs in [Exhibit 1](#). LCPC established UGAs to prioritize areas for development while preserving agricultural land and natural resources. UGAs typically surround already established urban and rural population centers or key transportation corridors. Lancaster County used these fundamental objectives in establishing the UGAs:

- Increase proportion, density and intensity of development;
- Place emphasis on compatible reinvestment, infill, and redevelopment;
- Improve the character and form of new redevelopment in UGAs;
- Increase housing choice and affordability; and
- Increase employment opportunities.



TRANSPORTATION SYSTEM, MOBILITY / ACCESSIBILITY CONTEXT

A robust and multi-faceted transportation network is present within the study area to move both people and goods through the northwest corner of Lancaster County. Key transportation infrastructure elements within the study area include:

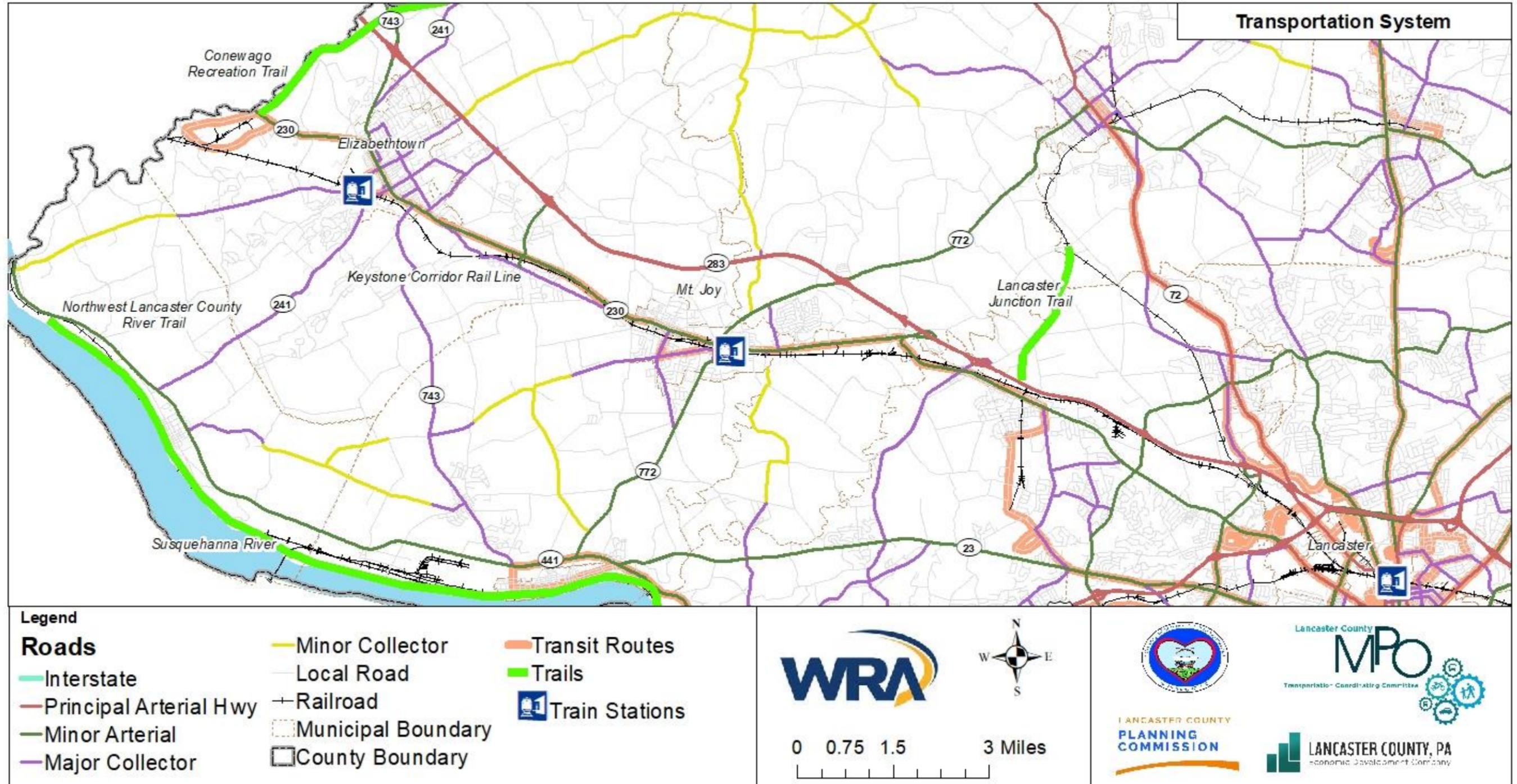
- **SR 283:** 4-lane east-west limited access highway connecting Harrisburg and Lancaster with interchanges in the study area at SR 743/South Hanover Street, Cloverleaf Road, SR 772/Mt. Joy Road, SR 230/Ebensshade Road, Spooky Nook Road, and SR 722/State Road.
- **SR 230:** Primarily 2-lane east-west minor arterial that parallels SR 283 connecting Harrisburg, Middletown, Elizabethtown, Rheems, and Mount Joy.
- **Keystone Corridor Rail Line:** Daily high-speed passenger rail service from Harrisburg to Philadelphia with stations in Elizabethtown, Mount Joy, and Lancaster.
- **Red Rose Transit** (*operated by South Central Transit Authority*): Service Route 18 provides transit service between Elizabethtown, Rheems, Mount Joy, and Lancaster.
- **SR 743:** 2-lane north-south minor arterial that connects Grantville, Hershey, Elizabethtown, Maytown, and Marietta.
- **SR 241:** 2-lane north-south minor arterial that connects Bainbridge, Elizabethtown, Colebrook, and Mt. Gretna.
- **SR 772:** 2-lane east-west minor arterial that connects Marietta, Mount Joy, Manheim, and Lititz.
- **SR 722/Centerville Road/State Road:** 2-lane north-south minor collector that connects Oyster Point, Neffsville, and East Petersburg.
- **Cloverleaf Road/Colebrook Road:** 2-lane north-south minor collector that connects Rheems and Marietta.
- **Harrisburg Pike:** 2-lane east-west minor arterial/collector that connects Salunga, Landisville, and Lancaster.
- **Conewago Recreation Trail:** 5.1 mile shared-use trail connecting Elizabethtown to the 14.5 mile Lebanon Valley Rail-Trail which terminates in Lebanon.
- **Lancaster Junction Trail:** Rail trail connecting Spooky Nook Sports Complex at Champ Boulevard to west of the intersection of Auction Road and Warehouse Road in Lancaster Junction.
- **Northwest Lancaster County River Trail** – 14.1 mile rail trail along the Susquehanna River from Falmouth to Columbia.



These transportation elements along with many rural collector routes compose the core transportation network within northwest Lancaster County as depicted in [Exhibit 3](#). When examining [Exhibit 3](#), it is important to note the location of the Keystone Corridor Rail Line (KCRL). The KCRL is a critical network element for both Lancaster County and Southeastern PA. Over 550,000 riders use the KCRL per year from Lancaster City alone. However, the proximity of the rail line to SR 283 does result in some transportation challenges. Since the KCRL is high speed, all crossings of the KCRL must be grade separated, which significantly limits the number of crossings due to the cost of creating new grade separations. This effectively guides all modes of transportation to cross the rail line at few locations, creating bottlenecks and reducing access to the urban centers and SR 283 from south to north across the KCRL.



Exhibit 3 – Existing Transportation System Overview





FUTURE CONDITIONS

ANTICIPATED GROWTH

Over the next 20+ years to the year 2040, Lancaster County's population is expected to increase by approximately 100,000 new residents in 40,000 new households. With this growth, the SR 283/230 study area is expected to attract both new employment centers and new residents, potentially placing strain on the existing transportation network and surrounding land uses. The future may also bring higher amounts of commuter traffic through the study area as surrounding areas also experience growth.

For the future land use scenario analysis, the project team examined current employment projections within the county and study area traffic analysis zones (TAZs). TAZs are used within the regional travel demand model, which can analyze potential transportation impacts from decisions to invest in a range of transportation improvements.

The original data shows commercial employment decreasing from 2017 to 2040, industrial growing slightly, and service employment growing significantly (*Exhibit 4*). Collaborating with the County and EDC, it was determined that a customized employment projection should be used to establish an economic development scenario for the purpose of this study. The chosen land use scenario represented a maximum industrial build-out by 2040. The team redistributed employment from the 2040 countywide total target to the 2015 Available Land by TAZ using the 2021 proportions by industry code held constant for 2040. This resulted in the new future economic development scenario that includes a projected growth of 7,085 industrial employees countywide, with correspondingly adjusted retail and service employment (



Exhibit 5). An objective of this study was to understand which transportation and land use improvements could attract 50% of the countywide industrial employment opportunities (3,543 new industrial jobs) to the corridor.

This scenario was used to evaluate the land that would be needed to accommodate the employment and housing growth by 2040 when comparing [Exhibit 4](#) and [Exhibit 5](#). The original population projections were examined in a similar manner and deemed reasonable for the scenario analysis; therefore, the original population projections were maintained ([Exhibit 6](#)).

Exhibit 4 – Employment Projections (Original)

Employment Scenario	Countywide		Study Area	
	Total	Growth	Total	Growth
All Types 2017	299,981	25,399	69,385	4,785
All Types 2040	325,380		74,170	
Industrial 2017	74,018	942	17,910	234
Industrial 2040	74,960		18,144	
Retail 2017	49,549	-2,639	16,156	-867
Retail 2040	46,910		15,289	
Service 2017	176,417	27,096	35,312	5,427
Service 2040	203,513		40,739	



Exhibit 5 – Employment Projections (Economic Development Scenario)

Employment Scenario	Countywide		Study Area	
	Total	Growth	Total	Growth
All Types 2017	299,981	25,401	69,385	6,852
All Types 2040	325,382		76,237	
Industrial 2017	74,018	7,085	17,910	3,543
Industrial 2040	81,103		19,311	
Retail 2017	49,549	5,142	16,156	1,040
Retail 2040	54,691		17,196	
Service 2017	176,417	13,171	35,312	4,418
Service 2040	189,588		39,730	

Exhibit 6 – Population Growth

Scenario	Countywide		Study Area	
	Total	Growth	Total	Growth
Households 2017	207,345	39,332	36,367	7,163
Households 2040	246,677		43,530	
Population 2017	554,373	97,608	92,487	17,821
Population 2040	651,981		110,308	

COMPREHENSIVE PLAN VISION

Lancaster County’s Comprehensive Plan, *places2040*, reinforces the desire to direct most of the anticipated growth within the existing UGAs and the importance of carefully managing large tracts of land within the UGAs, by reserving them for mixed-use, commercial, industrial, or institutional uses. In 2040, 62 percent of land within UGAs would remain available for future growth, if the density policies identified in the plan are fully implemented. Improving and modernizing the existing transportation infrastructure and providing new connections will be crucial to accommodating this growth sustainably. One of the key concepts in *places2040* is to take a place-based approach to improving and enhancing communities, corridors, and landscapes. The SR 283/230 corridor has been identified as one of those priority corridors in the plan. Additional details can be found online at www.places2040.com.



COMMUNITY DESIRES

As noted in *places2040*, the community overwhelmingly supported the Places scenario, which is based on effective and efficient development and preservation incorporating infill, redevelopment and reuse, effective farm zoning and agricultural land preservation, and protection of natural resources and landscapes. *places2040* summarizes the community’s desired scenario into five “big ideas”:

1. **Creating Great Places** – Encourage interaction, promote healthy lifestyles, create a sense of belonging, and spark creativity and investment.
2. **Connecting People, Place, & Opportunity** – Providing and improving connections between people and places will allow the county to retain and attract a skilled workforce which will lead to community wealth.
3. **Take Care of What We Have** – Be stewards to the world-renowned farmland, vibrant urban places, and outstanding natural areas while leveraging and strengthening our existing resources.



4. **Growing Responsibly** – *Manage the location, pattern, and timing of growth to develop in a more compact, efficient, and fiscally responsible way.*
5. **Thinking Beyond Boundaries** – *Approach our challenges and opportunities more collaboratively by cultivating leadership and existing public, private, and nonprofit partnerships.*

In addition to the countywide community desires described by *places2040*, specific desires for the SR 283 and SR 230 study area were solicited from this study's PAC members:

Land Use Impacts - Carefully plan the interface of residential and industrial land uses; identify opportunities for sustainable growth by allowing water and sewer suppliers to evaluate and plan for growth; balance developmental growth and agricultural resources; consider the effects that land use and transportation investments have on one another.

Transportation Improvements - Identify transportation issues that are inhibiting growth; identify projects and pathways for inclusion on the Transportation Improvement Program (TIP); address capacity and safety issues at SR 283 interchanges;

Multimodal Transportation - Encourage alternative and multimodal transportation with special focus given to areas near schools to reduce the need for busing; identify transit needs and accommodations early during the land development planning process; and

Municipal Coordination - Leverage inter-municipal coordination and use a consistent approach to development among corridor municipalities.

TRANSPORTATION AND LAND USE NEEDS

Identifying future transportation and land use needs was a crucial role that PAC members played in this study. During PAC Meeting 1, members participated in break-out sessions to discuss current economic development challenges, challenges between the transportation network and land use, safety and congestion issues, and potential solutions to address these needs. Maps of potentially underutilized parcels, identified by LCPC and EDC as a precursor to this study, were used to facilitate discussion. The outcomes of these discussions are summarized in graphical format (*Exhibits 7 through 11*).



Exhibit 7 – Transportation and Land Use Needs – Downtown Elizabethtown

Downtown Elizabethtown

- Need better multimodal connections
 - Consider resident/business impacts
- Sidewalk gaps exist
- Need better roadway connections to alleviate congestion
- Need improved pedestrian access/accommodations at traffic signals to encourage students to walk to school
- Roadway constraints in the area forces truck traffic downtown
- Truck traffic creates congestion and noise issue downtown
- Need additional/better connections over the railroad, railroad creates barrier
- Passenger rail is expected to grow, need to account for and plan ahead
 - Opportunity for commuter or light rail
- Water/sewer infrastructure may be nearing capacity
 - Access to wells and potable water is a challenge

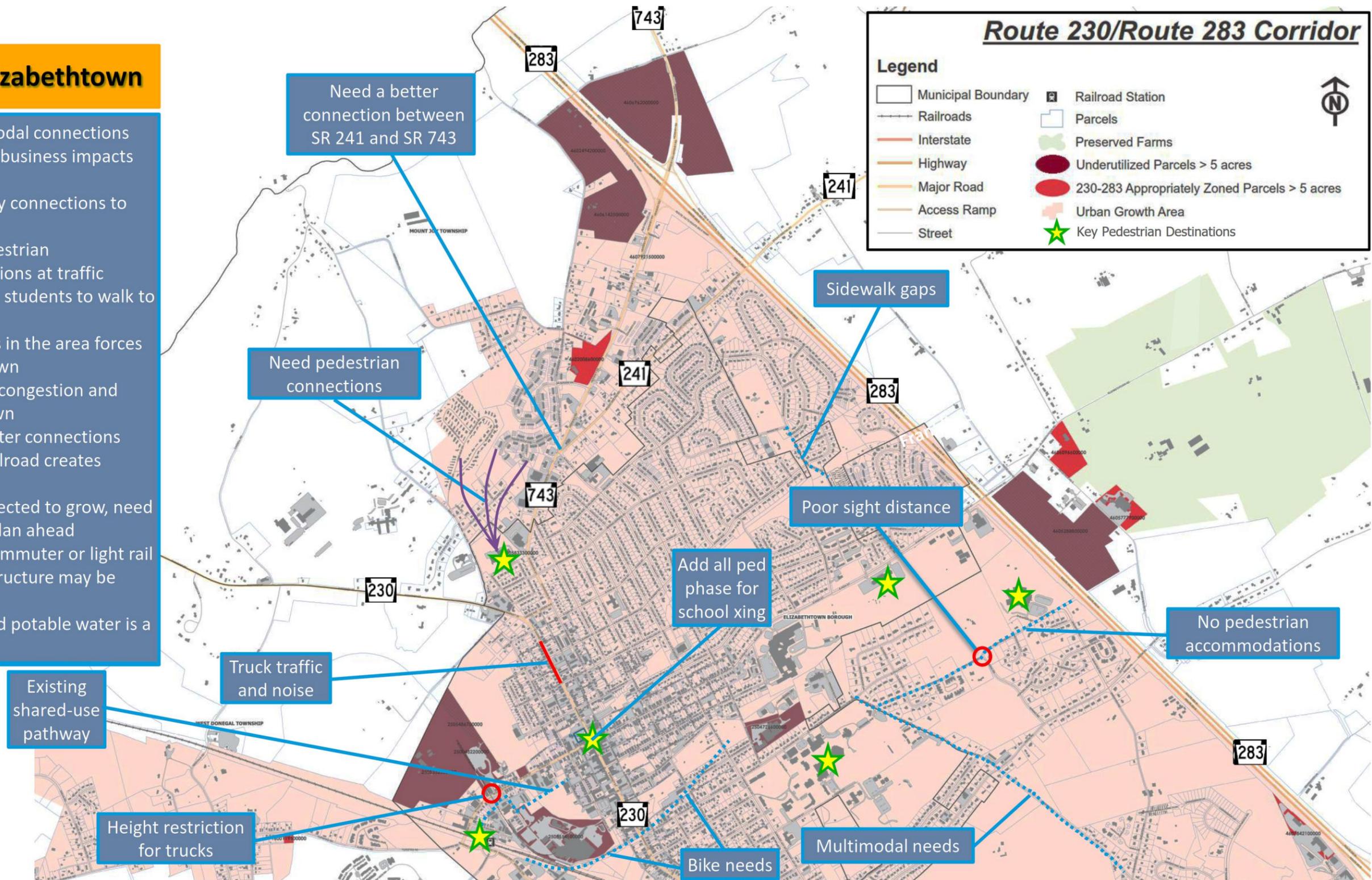




Exhibit 8 - Transportation and Land Use Needs – Mount Joy Borough

Cloverleaf Area

- How will Cloverleaf Road Interchange reconfiguration impact Market Street?
- Need better roadway connections to alleviate congestion
- Need improved pedestrian access/accommodations at traffic signals to encourage students to walk to school

- Tight turn radii for trucks
- Trucks must travel through town to SR 283

Main thoroughfare between SR 283 and US 30

Heavy truck traffic between SR 283 & US 30

Potential for interchange in future

Potential roadway connections

- Geometry limits capacity/ mobility
- Increased residential traffic
- Interchange being redesigned
- Improve truck routing/access

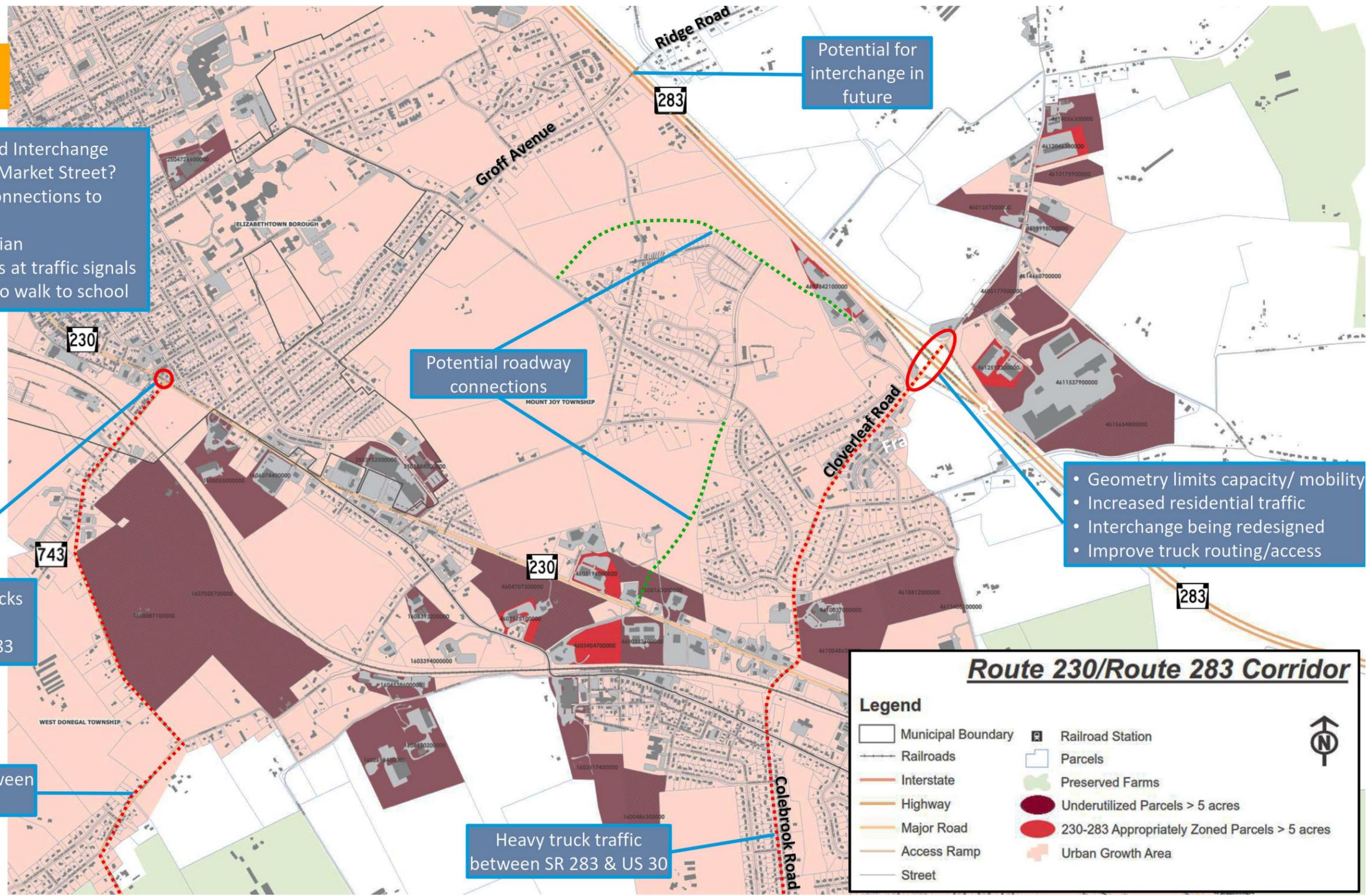




Exhibit 9 – Transportation and Land Use Needs – Cloverleaf Area

Mt Joy Borough

- Improve routing for SR 772 through downtown
- Parking utilization study planned
- Desire to create multimodal connections between all of Mt. Joy's parks
- Desire to implement complete streets strategies within downtown
- Need connection to Northwest River Trail
- Water/sewer capacity to be upgraded
 - Limitations of receiving stream for wastewater
 - Need additional water supplies for growth

\$25M upgrade currently underway to Amtrak Station; construction 2-3 yrs

Difficult NB left turn, especially for trucks

Need better connection between SR 772 & SR 230

Single lane underpass on Longnecker Rd

Potential site for industrial development; site access concerns

Route 230/Route 283 Corridor

Legend

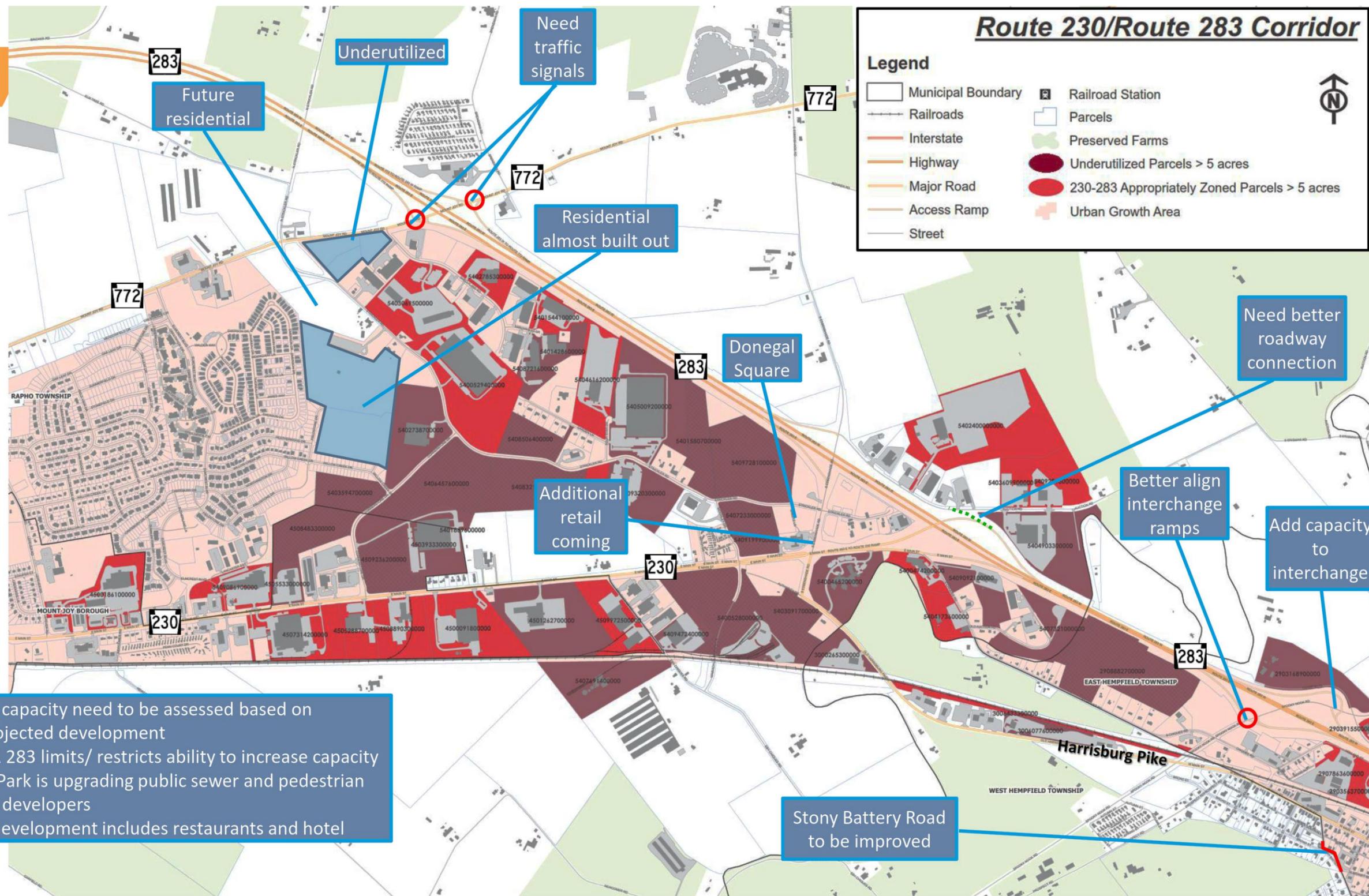
Municipal Boundary	Railroad Station
Railroads	Parcels
Interstate	Preserved Farms
Highway	Underutilized Parcels > 5 acres
Major Road	230-283 Appropriately Zoned Parcels > 5 acres
Access Ramp	Urban Growth Area
Street	





Exhibit 10 – Transportation and Land Use Needs – Rapho Triangle

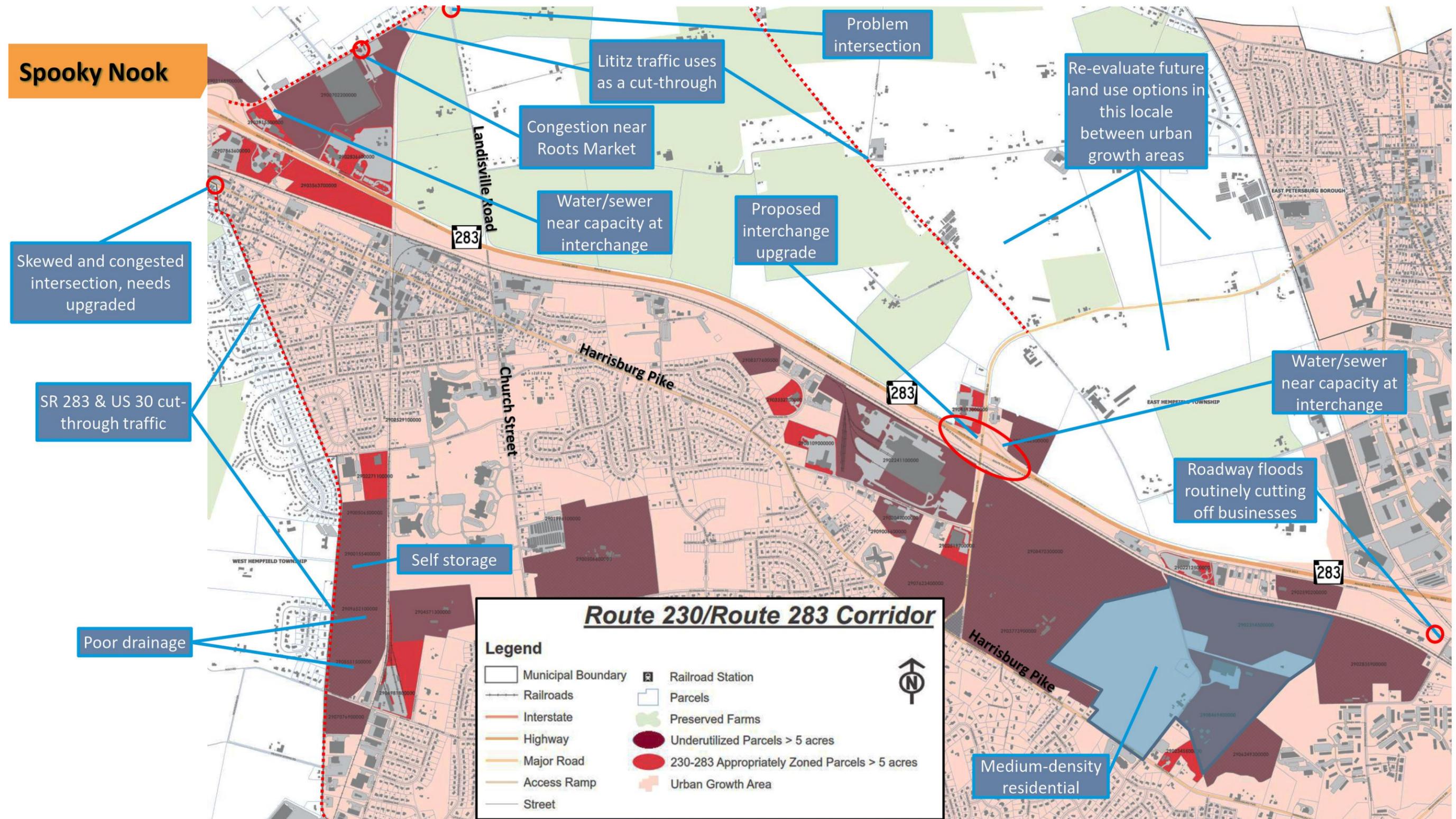
Rapho Triangle



- Water and sewer capacity need to be assessed based on anticipated or projected development
- Railroad and SR 283 limits/ restricts ability to increase capacity
- Rapho Industrial Park is upgrading public sewer and pedestrian infrastructure via developers
- Donegal Square development includes restaurants and hotel



Exhibit 11 – Transportation and Land Use Needs – Spooky Nook





LAND USE AND TRANSPORTATION ANALYSIS

PARCEL SUITABILITY ANALYSIS

METHODOLOGY

A parcel suitability analysis was performed to identify parcels that might be likely development sites for households and employment for the economic development scenario. It was determined by the PAC to analyze all parcels without consideration of their current zoning, in order to remain open-minded about potential zoning changes and identify why specific tracts may be underutilized. This process was driven by geospatial information provided by LCPC and guided by input from the PAC. The purposes of this evaluation were to:

- Better identify why certain parcels are underutilized;
- Determine factors limiting development, such as public water or sewer services; and
- Investigate whether changes in zoning could encourage and meet the needs of municipal growth to the mutual benefit of the study area and county.

Along the study corridor, there are 1,300 available parcels within the UGA. Of those, 1,066 (82%) parcels are vacant and 234 (18%) parcels represent infill development opportunities. Vacant parcels are those that are currently unoccupied, and infill describes parcels that are in use but could be redeveloped over the years. The PAC identified land use and transportation measures that are important locational considerations for four general types of development: industrial, commercial, residential, and agricultural. Spatial data for each parcel was paired with a weighting system to measure the suitability of a parcel for those land uses. The results of the analysis were used to identify the selected land use for each parcel to accommodate the 2040 economic development scenario. Parcels were vetted by municipal leadership, LCPC, and EDC, and removed from the scenario if they were identified as undesirable or undevelopable due to poor soil, steep slopes, environmental concerns, storm water requirements, karst geology, or had ownership that is unlikely to change.

Each parcel's selected land use is the result of just one potential future scenario and is not to be interpreted as a finite land use or zoning recommendation. It is meant to explore the impacts that land use can have on the transportation system. Further analyses may be required, and as always, good judgment should be exercised when deciding to make zoning changes.

DATA INPUTS

The metrics used to develop the scenario weighting for each parcel's selected land use and an explanation of what condition is preferred are summarized for the four generalized land use categories – industrial ([Exhibit 12](#)), commercial ([Exhibit 13](#)), residential ([Exhibit 14](#)), and agricultural ([Exhibit 15](#)).

Some common metrics were identified to evaluate every land use type – examples include parcel fragmentation ([Exhibit 16](#)), parcel size ([Exhibit 17](#)), parcel shape ([Exhibit 18](#)), land use adjacency ([Exhibit 19](#)), water service access ([Exhibit 20](#)), sewer service access ([Exhibit 21](#)), walk accessibility to community services and transportation ([Exhibit 41](#)), and drive accessibility to key locations ([Exhibit 42](#)).

Each parcel was given a “score” using the individual metrics described above, which involved weighting each metric by a factor to compare the results of the parcel suitability analysis. For example, parcel shape was weighed as less important than walkability for commercial uses. These weighting factors were iteratively determined with input from LCPC and EDC. Parcel size and shape, as well as access to water and sewer services were important for many of the land use types.

It should be noted that the water and sewer service boundaries available in GIS are only planning-level and are not distinct service boundaries. This information was used to determine the likelihood of service, rather than a distinct indication of existing service. A buffer was created around the existing service areas to represent potential ease of connection. Outside of that buffer area, the analysis assumed water and sewer service was unlikely.



Exhibit 12 – Industrial Parcel Suitability Measures

Metric No.	Measure	Weight	Preferred Condition for Higher Score
I-1	Parcel size	1	Bigger is better
I-2	Parcel shape	1	Square is better; long and thin not ideal
I-3	Parcel fragmentation	1	Less is better
I-4	Nearby residential density	1	Sparse is better
I-5	Adjacent to existing industrial	1	More similar uses are better
I-6	Adjacent to vacant/infill parcel	1	Potential to combine with other parcels for more development
I-7	Nearby roadway Functional Classification	1	Higher class is better
I-8	Travel time to interstate	1	Shorter is better
I-9	Direct access to interstate	0.5	Access is better
I-10	Travel time to transit SR	1	Closer is better
I-11	Access to railroad	0.5	Access is better
I-12	Access to water/sewer service	1	Access is better

Exhibit 13 – Commercial Parcel Suitability Measures

Metric No.	Measure	Weight	Preferred Condition for Higher Score
C-1	Parcel shape	0.5	Square is better, long and thin are not ideal
C-2	Parcel fragmentation	0.5	Less is better
C-3	Adjacent to existing commercial	1	More similar uses are better
C-4	Adjacent to vacant/infill parcel	1	Potential to combine with other parcels for more development
C-5	Nearby roadway Functional Classification	1	Collector or Minor Arterials Best
C-6	Travel time to police/fire/EMS	1	Closer is better
C-7	Travel time to transit SR	1	Closer is better
C-8	Commuting travel time to central business districts	1	Closer is better
C-9	Access to water/sewer service	1	Access is better
C-10	Walkability - sidewalk network nearby	1	More pedestrian infrastructure is better



Exhibit 14 – Residential Parcel Suitability Measures

Metric No.	Measure	Weight	Preferred Condition for Higher Score
R-1	Parcel shape	0.5	Square is better, long and thin are not ideal
R-2	Parcel fragmentation	0.5	Less is better
R-3	Nearby residential density	1	Denser is better
R-4	Distance from industrial land use	0.5	Further is better
R-5	Distance from agricultural land use	0.5	Further is better
R-6	Adjacent to existing residential	1	More similar uses are better
R-7	Nearby roadway speed limit	1	Lower speed is better
R-8	Walkability to: schools, parks, grocery, hospital, commercial/retail	1	Closer is better
R-9	Travel time to transit SR	1	Closer is better
R-10	Travel time to police/fire/EMS	1	Closer is better
R-11	Commuting travel time to central business districts	1	Closer is better
R-12	Access to water/sewer service	1	Access is better

Exhibit 15 – Agricultural Parcel Suitability Measures

Metric No.	Measure	Weight	Preferred Condition for Higher Score
A-1	Parcel size	0.33	Bigger is better
A-2	Parcel shape	0.33	Square is better, long and thin are not ideal
A-3	Parcel fragmentation	0.33	Less is better
A-4	Nearby residential density	0.5	Sparse is better
A-5	Adjacent to existing agriculture	1	More similar uses better
A-6	Adjacent to vacant/infill parcel	1	Potential to combine with other parcels for more development
A-7	Is parcel protected agriculture?	1	Protected is better
A-8	Nearby roadway Functional Classification	1	Major Collector is best



Exhibit 16 – Fragmented Parcels

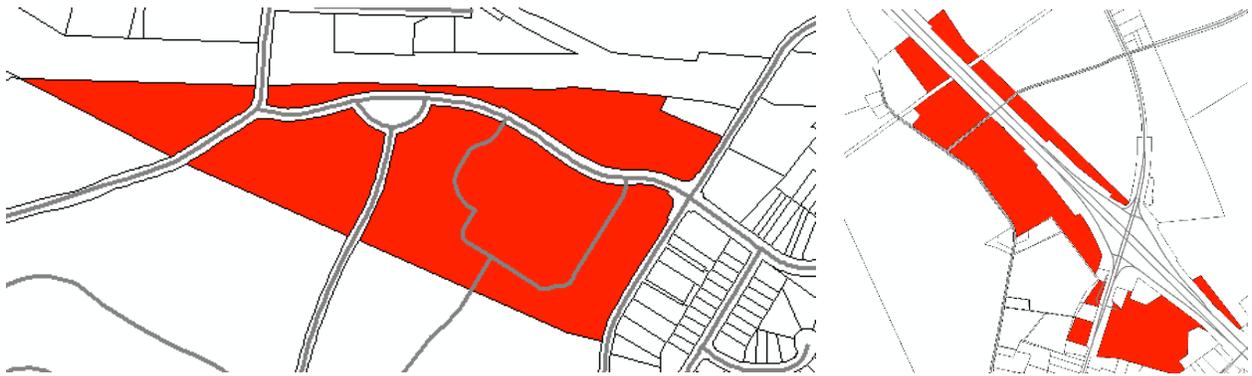


Exhibit 17 – Parcel Size Distinctions

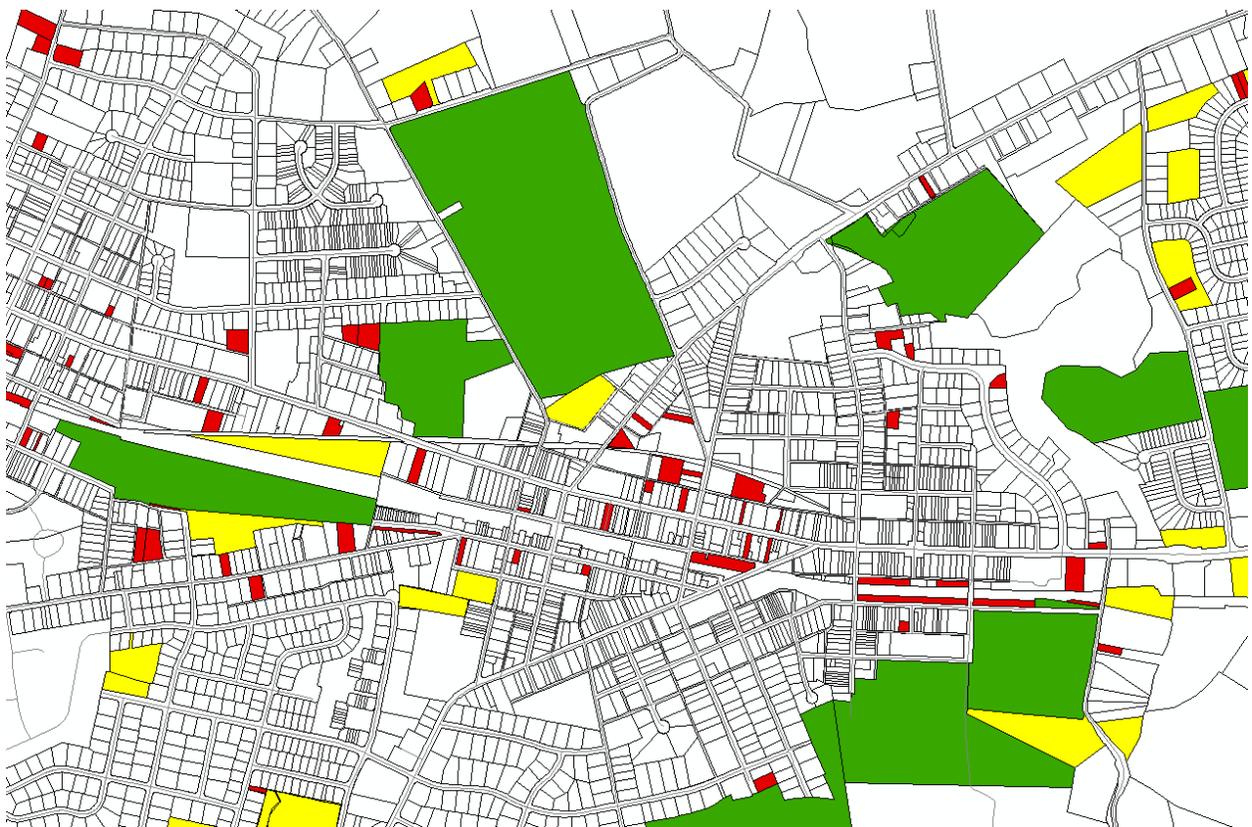




Exhibit 18 – Parcel Shape Distinctions

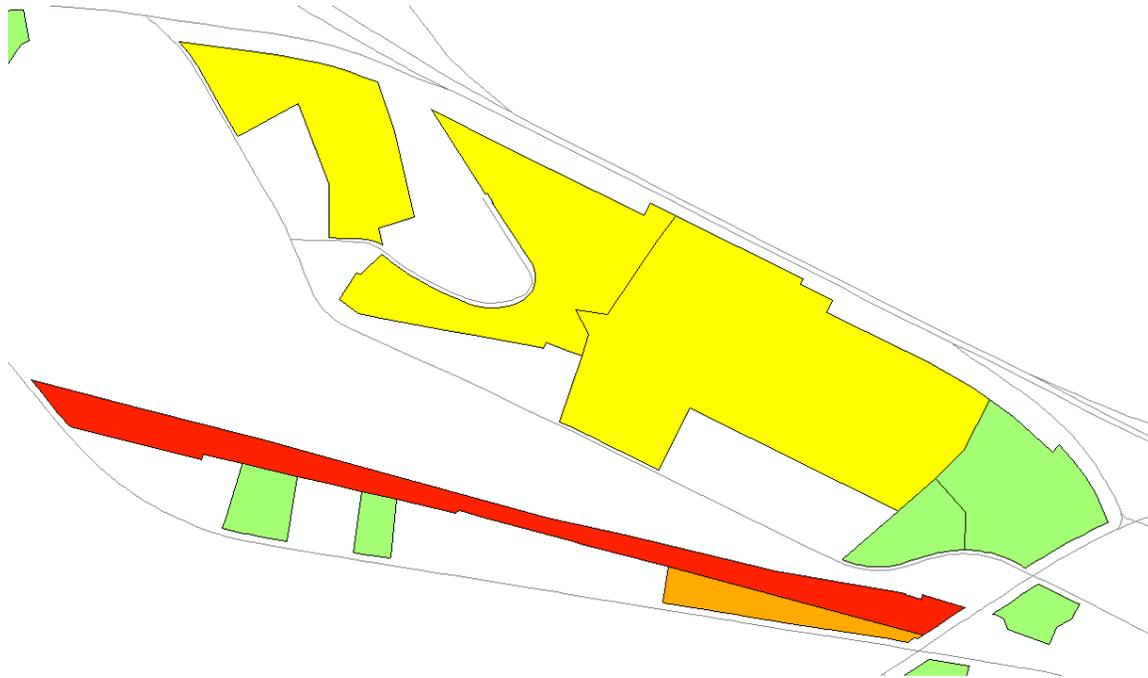


Exhibit 19 – Land Use Adjacency

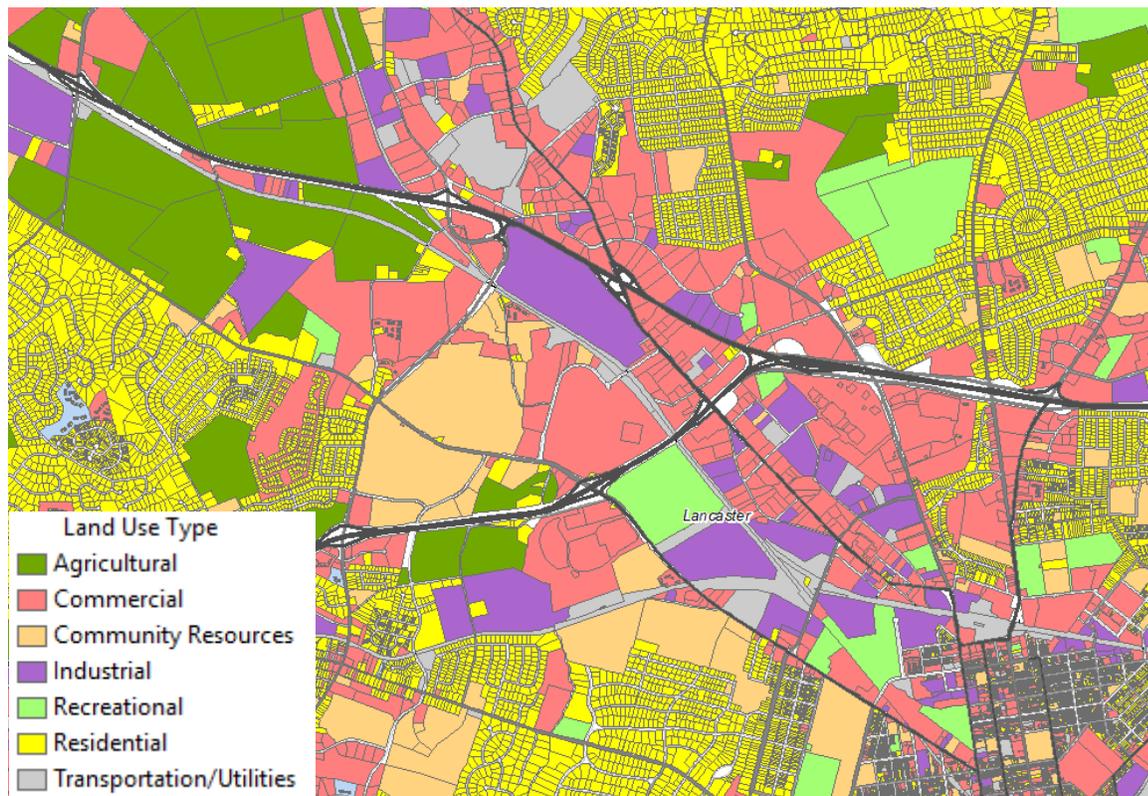




Exhibit 20 – Likelihood of Water Access

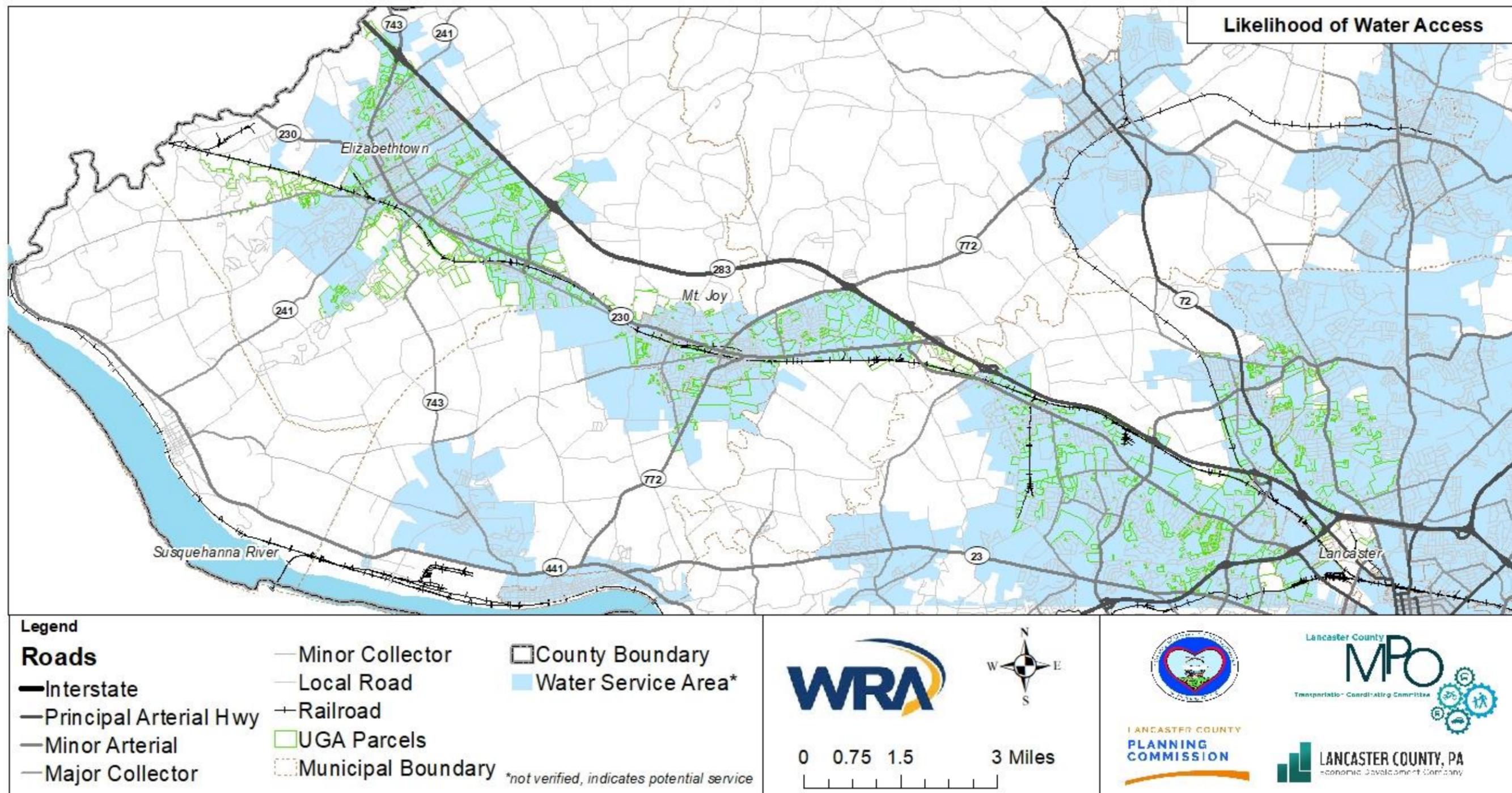
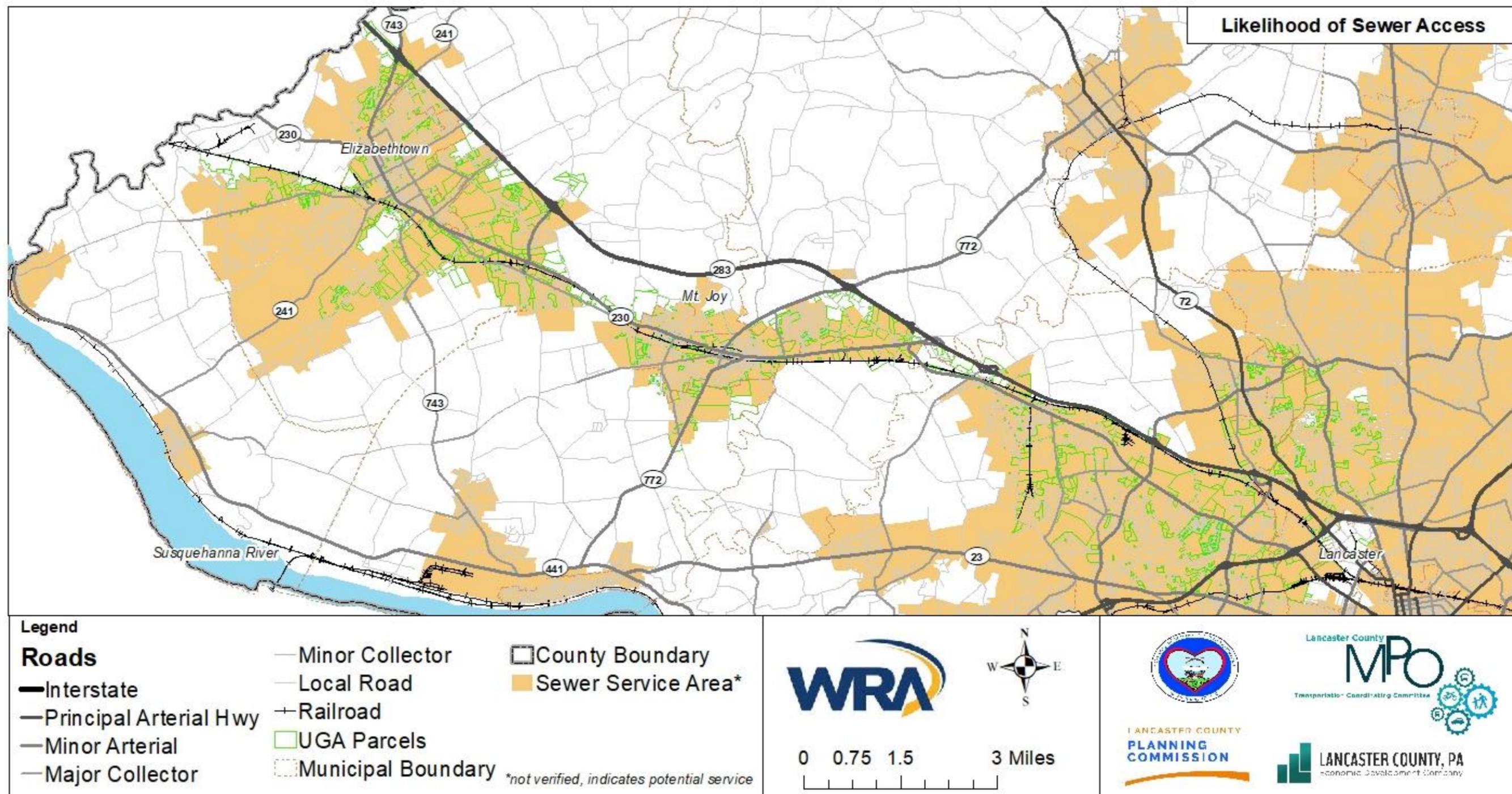




Exhibit 21 – Likelihood of Sewer Access





DATA OUTPUTS

Outputs from the parcel suitability analysis included scores for industrial, commercial, residential, and agricultural land uses for each parcel. The data layers behind this analysis are provided electronically to the County with the final report. All 1,300 parcels have a value assigned for each of the four general land use types, but not all parcels are required to develop to accommodate the projected growth for the 2040 economic development scenario as discussed under the **Anticipated Growth** section.

To determine the 2040 Selected Land Use scenario, the study team examined projected housing and employment to determine the acreage of each land use type needed by 2040. This was done to focus development only to the parcels with anticipated need, and to ensure availability of developable land beyond 2040. Parcel scores for the four land uses were compared to select the optimal land use for the scenario.

The amount of land needed for the commercial and industrial land use types by 2040 was determined by converting the projected employment into the necessary building square footage needed using an average square foot per employee, then multiplied by a developable land factor. This converted employee growth to a needed acreage, and the most suitable parcels were selected until the acreage needs for each land use were met. For residential land use, the analysis assumed that residential parcels must be greater than half an acre to support the desired average density of 7.5 units per acre (as outlined in *places2040*) and parcels were selected until they satisfied the needed acreage for the projected household growth.

As described in *places2040*, the community as a whole strongly desires preserving agricultural resources. To this end, only parcels within the Urban Growth Areas were used in this scenario analysis. All parcels could have been considered in the suitability analysis, but the study team felt that approach would not align with the county's vision of directing growth to the UGAs to preserve agricultural and open space to maintain the county's character. Maintaining agricultural land use is important; however, no agricultural growth projections are available. Therefore the 2040 scenario analysis included only the "developable" land use types – industrial, residential, and commercial. Both vacant and infill parcels were analyzed together within the UGA.

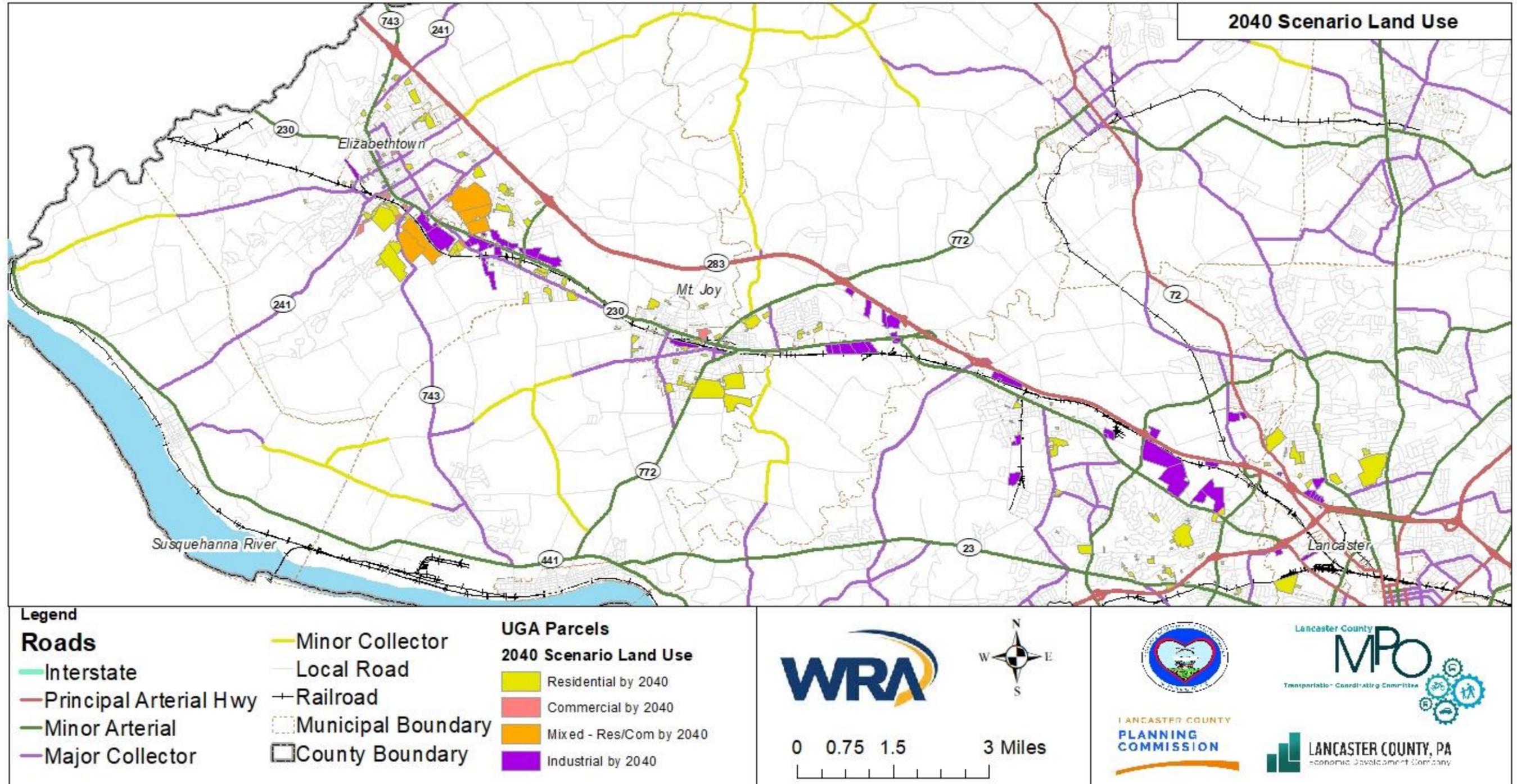
The results of the analysis suggest the following:

- Projected industrial employment growth within the study area can be accommodated with the top 60 industrial parcels.
 - 604 acres to accommodate 3,543 industrial employees
 - Of those 60 parcels, 36 are vacant parcels (60%) and 24 are infill (40%)
- Projected residential housing needs within the study area can be accommodated with the top 190 residential parcels.
 - 955 acres to accommodate 7,163 dwelling units
 - Of those 190 parcels, 140 are vacant (74%) and 50 are infill (26%)
- Projected commercial employment growth within the study area can be accommodated with the top 62 commercial parcels.
 - 255 acres to accommodate 5,458 retail and service employees
 - Of those 62 parcels, 58 are vacant (94%) and 4 are infill (5%).

A few large parcels near Elizabethtown scored highly for all land use types; these were vetted by LCPC and noted as potential mixed-use development areas for residential and commercial land use by 2040. Large developable areas such as these will become rarer in the future and may have significant impacts on the surrounding transportation system and land uses. As such, these developments should be carefully planned and coordinated among municipalities and agencies to ensure that the necessary transportation investments are made within the area, and that appropriate development is selected that fits within the fabric of the existing community and is in harmony with the comprehensive plan vision. A graphical representation of the 2040 Selected Land Use Scenario can be seen in [Exhibit 22](#).



Exhibit 22 – 2040 Selected Land Use Scenario



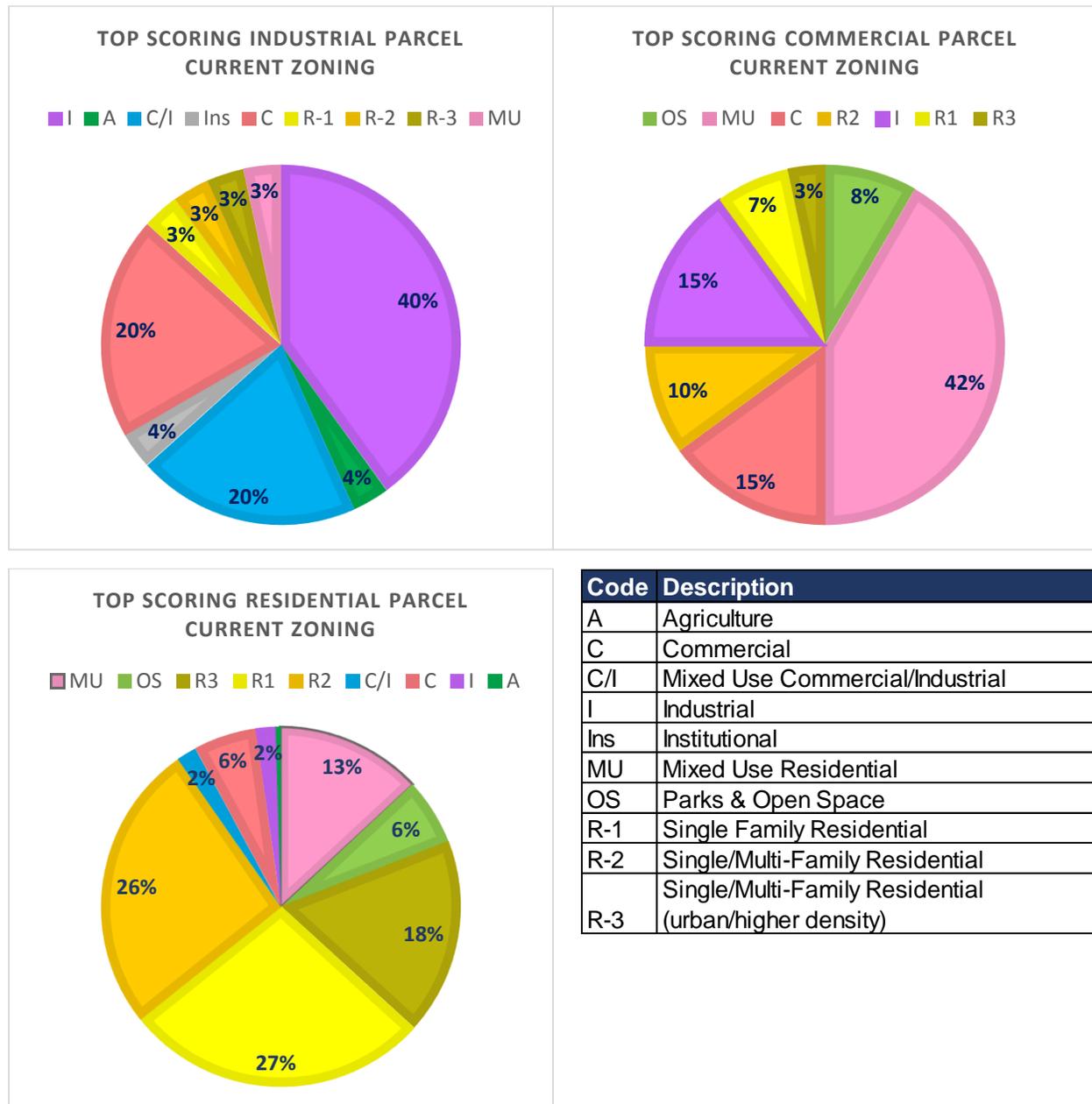


Comparison of Selected Land Uses to Existing Zoning

The selected land uses were identified without consideration of current zoning to allow for an unbiased selection of parcels. In order to check reasonableness, the team performed a comparison of the parcel suitability results to the existing zoning and found promising results. A majority of the highest scoring parcels for commercial and residential are already zoned for such uses (*Exhibit 23*). This points to the soundness of the land use metrics developed by the PAC, and the history of existing zoning guiding suitable development for a majority of the parcels.

However, the value of this step is to identify parcels in need of further evaluation that are scoring high for a land use type for which current zoning restricts this type of development. For residential, over 70% is zoned for some type of residential. For commercial, 57% is zoned commercial or mixed-use. For industrial, 63% of the land is currently zoned industrial, mixed use, or commercial/industrial.

Exhibit 23 - Comparison of Highest Scoring Parcels by Land Use to Current Zoning





LAND USE AND TRANSPORTATION SYSTEM ANALYSIS

METHODOLOGY

To meet the objectives of the study, a graduated approach was employed to evaluate the impacts future projected growth would have on the transportation system with and without modifications to land use and the transportation system. Four scenarios were modeled that include combinations of modifications to travel supply and travel demand.

To this end, the following four scenarios were modeled:

1. **2017** – Base 2017 Condition
2. **2040** – Future 2040 Conditions with Current Land Use Patterns
3. **2040LU1** – Future 2040 Conditions with Selected Land Use as identified by parcel analysis
4. **2040LU1T1** - Future 2040 Conditions with Selected Land Use and Transportation Improvements

Fundamentally, there are two basic ways to address congestion – by increasing supply or decreasing demand. The “supply” is the transportation network. The “demand” is the people who desire to travel to destinations in Lancaster County. For the example of the automobile, if all other aspects are held constant and the supply of roadway is increased by adding lanes, widening, or creating new interchanges, congestion will alleviate. However, realistically increasing the supply on a corridor may create traffic diversions and attract development, therefore, generating more demand.

Congestion will decrease if the demand on the roadways decreases; this involves moving people out of single occupancy vehicles and into modes of transportation such as rail, bus, ridesharing, carpooling, walking, or bicycling. This can be accomplished through providing transportation choices, upgrading infrastructure, expanding transit routes or frequency, station upgrades, and providing sidewalks, multi-use paths, and bicycle lanes. Demand can also be influenced on the land use side by encouraging communities to develop mixed land uses within proximity where residents may work, shop, or recreate without driving.

Measuring traffic congestion is important, as congestion affects quality of life, the environment, and economic development. Roadway congestion affects how quickly freight can move throughout the corridor. It also affects how efficiently residents can access goods and services and their places of employment, impacts their quality of life, and influences the attractiveness of new places for development.

The Lancaster County Travel Model (LCTM)¹ was used to establish the countywide travel demand for the modeling analysis. This data was fed into a post-processing tool developed for this study that disaggregated the regional travel demand to the parcel level. At this level, each parcel was analyzed as a traffic analysis zone (TAZ), where trips originate at an individual parcel and are destined to other parcels in the study area. Pairing parcel TAZs with a comprehensive transportation network that includes all local roads, trails, and sidewalks allowed the team to test the nuanced impacts of modifications to land use and multimodal improvements. One caveat to this model analysis is the lack of rail freight and passenger data; this information is not typically included in regional travel demand models and validation data is widely unavailable. As such, the model analysis is not currently able to detect freight and passenger rail capacity nor predict future congestion; however, several PAC members noted that the railroad is currently nearing capacity and impacting the ability of industrial sites to expand along the corridors.

¹ For additional details regarding the Lancaster County Travel Model (LCTM), refer to the *LCTM User Guide and Validation Document* developed by Michael Baker International



TRANSPORTATION ANALYSIS

In addition to analyzing the selected land use scenario along the corridor based on the parcel analysis, the study evaluated the impacts of implementing transportation improvements. Transportation improvements for the study area were identified through sources described below.

Projects Identified by Others

- Transportation Improvement Program (TIP) – Projects currently scheduled on PennDOT’s TIP through 2020.
- Regional Plans and Studies – Projects identified by other planning studies, such as a municipality’s comprehensive plan or traffic impact study, as provided by LCPC.

Improvement Needs Identified by This Study

- Project Advisory Committee (PAC) - Improvement needs identified by PAC members that were not already identified on the TIP or other regional planning studies.
- Capacity Analysis – Improvement needs identified by the study team based on reviews of the available data and travel demand model results.

Transportation improvement needs analyzed within the study area were wide-ranging including roadway widening, interchange modifications, elimination of existing height/weight restrictions, transit modifications, and sidewalk or trail connections. The possible new improvements analyzed in this study are listed in [Exhibit 24](#) and are mapped in [Exhibit 25 through Exhibit 27](#). These possible future improvements are identified as follows:

- CAP – Improvements for consideration as a result of the capacity analysis for the 2040 Selected Land Use Scenario
- SW – Sidewalk/trail projects as a result of the accessibility analysis between neighborhoods, groceries, schools, and employment centers
- TRN – Transit projects as a result of 2040 Selected Land Use and transit accessibility analysis
- PAC – Project Advisory Committee suggested projects

Exhibit 24 – Conceptual Transportation Needs Analyzed

Need ID	Name/Description
CAP_01	Snyder Road improvement to potential new SR 283 interchange
CAP_02	Risser Mill Road improvements to potential new SR 283 interchange
CAP_03	Internal shared driveway for industrial sites between Cloverleaf Road and Main Street
CAP_04	Access road along SR 230 for industrial cluster driveway sharing
CAP_05	Shreiner Station Road new bridge alongside preserved covered bridge
CAP_06	Construct rear/alternative access to Spooky Nook Sports Complex from Landisville Road
CAP_11	New Snyder Road interchange with SR 283
CAP_12	New Risser Mill interchange with SR 283
CAP_13	Improved access management to industrial sites via driveway sharing
CAP_14	Industrial site near Cloverleaf Road /Main Street - Access management driveway - Right in, right out
CAP_16	Potential signal on E Main Street to consolidate entrance points between Elmcrest Boulevard and Cornerstone Drive in Mt. Joy Borough
CAP_17	Shreiner Station Road maintain covered bridge as pedestrian pathway
CAP_18	Maintain covered bridge at Erisman Road
CAP_19	Widen SR 283 to 3 lanes in each direction
CAP_20	Traffic signal upgrades and retiming on SR 230 from Linden Avenue in Elizabethtown Borough to Cloverleaf Road in Mt Joy Township



SR 283/230 Corridor Study: *Achieving a Sustainable Future*

Need ID	Name/Description
CAP_21	Traffic signal upgrades and retiming on SR 230 from Angle Street to Elmcrest Boulevard in Mt Joy Borough
SW_1	Path to Park City Mall along Shreiner Station Road
SW_2	Pedestrian bridge from mixed use development over railroad tracks to Elizabethtown
SW_3	Sidewalk along Maytown Avenue (SR 743) from new potential mixed use development driveway south of railroad bridge to Market Street
SW_4	Sidewalk along Sheaffer Road from new potential mixed use development driveway to S Mt Joy St to connect to grocery store and shops
SW_5	Sidewalks in Rheems on W Harrisburg Avenue and Colebrook Road to schools
SW_6	Rheems sidewalk extensions
SW_7	Sidewalk or sidepath along SR 230 and Cloverleaf Road - Rheems to Elizabethtown
SW_8	Sidewalk on Cloverleaf Road from commercial to residential
SW_9	Elizabethtown Borough sidewalk improvement program
SW_10	Sidewalk extension over SR 283 at E High Street
SW_11	Sidewalk to Bear Creek School and along Ridge Road overpass to Darrenkamps Elizabethtown Market
SW_12	Sidewalk along Mt Joy Road
SW_13	Complete SR 230 commercial gaps in sidewalk network within Mt. Joy Borough
SW_14	Anderson Ferry Road from Koser Road to Union School Road Donegal Jr High sidewalk
SW_15	Anderson Ferry Road SR 772 sidewalk connection to High School
SW_16	Sylvan Road large residential sidewalk connection
SW_17	Sidewalks near Lancaster General shops at Spring Valley Road and McGovernville Road
SW_18	Sidewalk on McGovernville Road from Spring Valley Road to Park City Apartments at Swarr Run Road
SW_19	Harrisburg Avenue sidewalk or sidepath from McGovernville Rd to existing sidewalk between Camp Meeting Rd and Elmwood Avenue near Landisville
SW_20	Stony Battery Road connections from Marietta Ave to Corporate Blvd between residential and commercial
SW_21	Sidepath to Hempfield Schools from residential development at Meadow Creek Dr
SW_22	Sidewalk along Manheim Pike north of SR 283 to Commercial Avenue
SW_23	Sidewalk along Manheim Pike under and south of SR 283 to US 30
SW_24	Manheim Pike sidewalk extension south of US 30 to Prince Street
SW_25	Kauffman Road sidewalk to Hempfield High School
SW_26	Church Street sidewalk to Landisville Schools and Sports Complex
SW_27	Sidewalk along Centerville Road from Marietta Avenue to Harrisburg Pike
SW_28	Dillerville Road bridge sidewalk connecting residential to Manheim Pike
SW_29	Lancaster Junction trail pedestrian bridge over SR 283
SW_30	Lancaster Junction trail extension south to Landisville Middle School and north to Manheim Borough
SW_31	Add sidewalk along Spooky Nook Road over SR 283 overpass
SW_32	Sidewalk connection along Cornerstone Drive in Mt Joy Township
SW_33	Sidewalk along E Main Street from Mt Joy Borough line toward Sheetz in Mt Joy Township
SW_34	Colonial Crest Drive / McGovernville Road connection to East Hempfield Parks
SW_35	Pinkerton road sidewalk from Marietta Avenue to Donegal Schools
SW_37	Sidewalk extension along Masonic Drive / SR 241 to Amtrak Station Elizabethtown
SW_38	Sidewalk extension along Development Drive to connect to Amtrak
SW_39	Masonic Village sidewalk extension along SR 241, Masonic Drive, and Turnpike Road railroad underpass to Elizabethtown
TRN_1	Transit line extension down Harrisburg Pike to Industrial Park
TRN_2	Transit line extension to mixed use properties, potential transit oriented development off of SR 230
TRN_3	Transit line extension down Anderson Ferry Road near high school and high density residential



SR 283/230 Corridor Study: *Achieving a Sustainable Future*

Need ID	Name/Description
PAC_02	Bear Creek Road at Spring Road safety improvement project to improve sight distance
PAC_03	Implement all-pedestrian phase for school crossing at Market Street and High Street in Elizabethtown Borough
PAC_04	Improve height-restricted bridge for trucks on W. High Street near the Elizabethtown Rail Station
PAC_06	SR 230/SR 743 intersection improvement project to enhance turn movements for trucks
PAC_07	Redesign SR 283/Cloverleaf Road interchange including improvements for geometry limits, capacity, and truck access
PAC_08	SR 230/SR 772 (East) intersection improvement/realignment to improve turn movements for trucks (SR 772 to SR 230)
PAC_09	SR 230/SR 772 (West) intersection improvement/realignment for a better connection (SR 772 to SR 230)
PAC_010	Improve bottleneck and height restriction for Joy Ave under railroad
PAC_013	Signalize SR 283 West/SR 772 Intersection
PAC_014	Signalize SR 283 East/SR 772 Intersection
PAC_015	SR 283 East/Spooky Nook Road create T-intersection by realigning ramps
PAC_016	SR 283/Spooky Nook Road interchange capacity improvement
PAC_017	SR 230/Stony Battery Road eliminate intersection skew and increase capacity
PAC_018	Landisville Road/Spooky Nook Road intersection safety and operations improvement
PAC_020	Improve drainage or provide additional access for businesses on Dairy Road to resolve flooding issues
PAC_100	Complete sidewalk gap on Northfield Drive to Buckingham Boulevard
PAC_101	Complete sidewalk gap on Radio Road to Northfield Drive to Buckingham Boulevard
PAC_102	Add sidewalk on Bear Creek Road to Bear Creek School (South)
PAC_103	Add sidewalk on Bear Creek Road to Bear Creek School (North)
PAC_104	Multimodal improvements on Campus Road from Schwanger to College Avenue including sidewalk and wider shoulders between Schwanger Road and Merts Drive
PAC_105	Add sidewalk along Mill Road and Lakeview Drive to Mill Road Elementary School to connect neighborhoods to school
PAC_106	Add sidewalk connection to cul-de-sac neighborhoods between Hillside Road and Indian Rock Circle to connect neighborhoods to Mill Road Elementary School
PAC_107	Bike improvements along College Avenue including a bike lane, shared-use, or wide shoulders
PAC_110	Bike connection/trail from Mt Joy to Northwest Trail
PAC_111	SR 283 West Off-Ramp connection to Auction Road improvements
PAC_112	Stony Battery Road improvements from Main Street to Brandt Boulevard
PAC_145	SR 283/Ridge Road Interchange (1 of 2) No Design Currently Proposed
PAC_146	SR 283/Ridge Road Interchange (2 of 2) No Design Currently Proposed



Exhibit 25 – Transportation Improvements Overview Map (CAP)

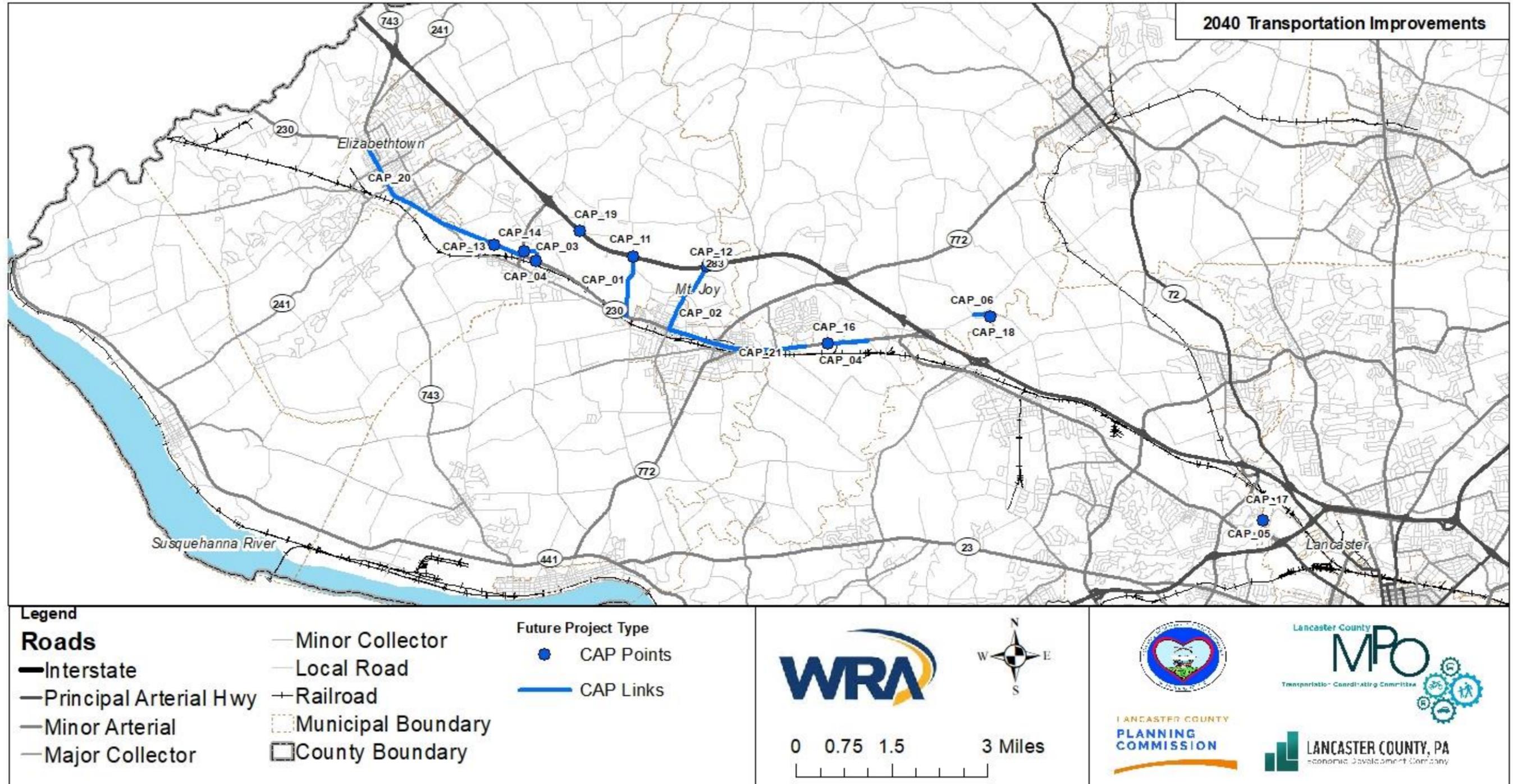




Exhibit 26 - Transportation Improvements Overview Map (SW and TRN)

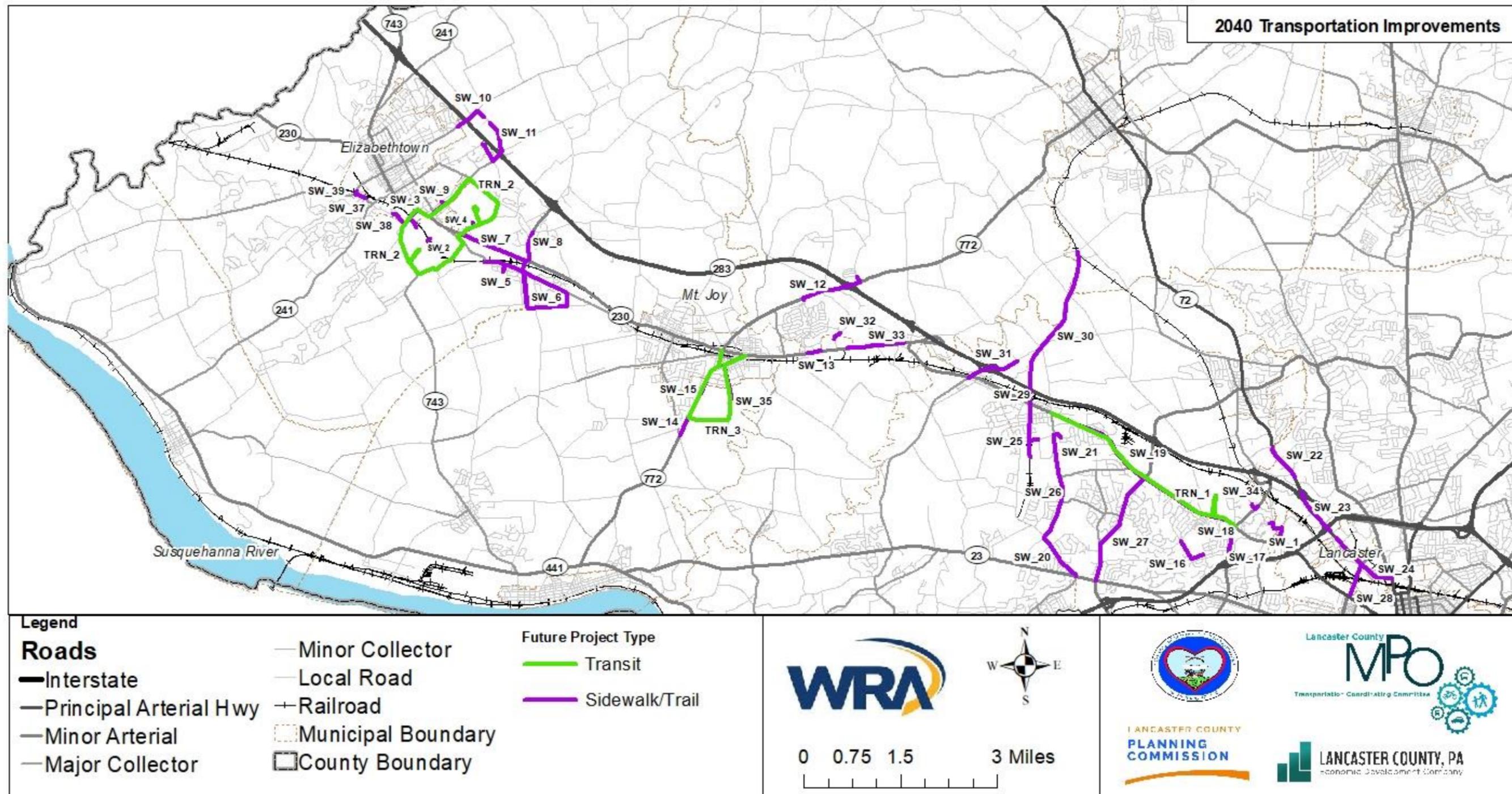
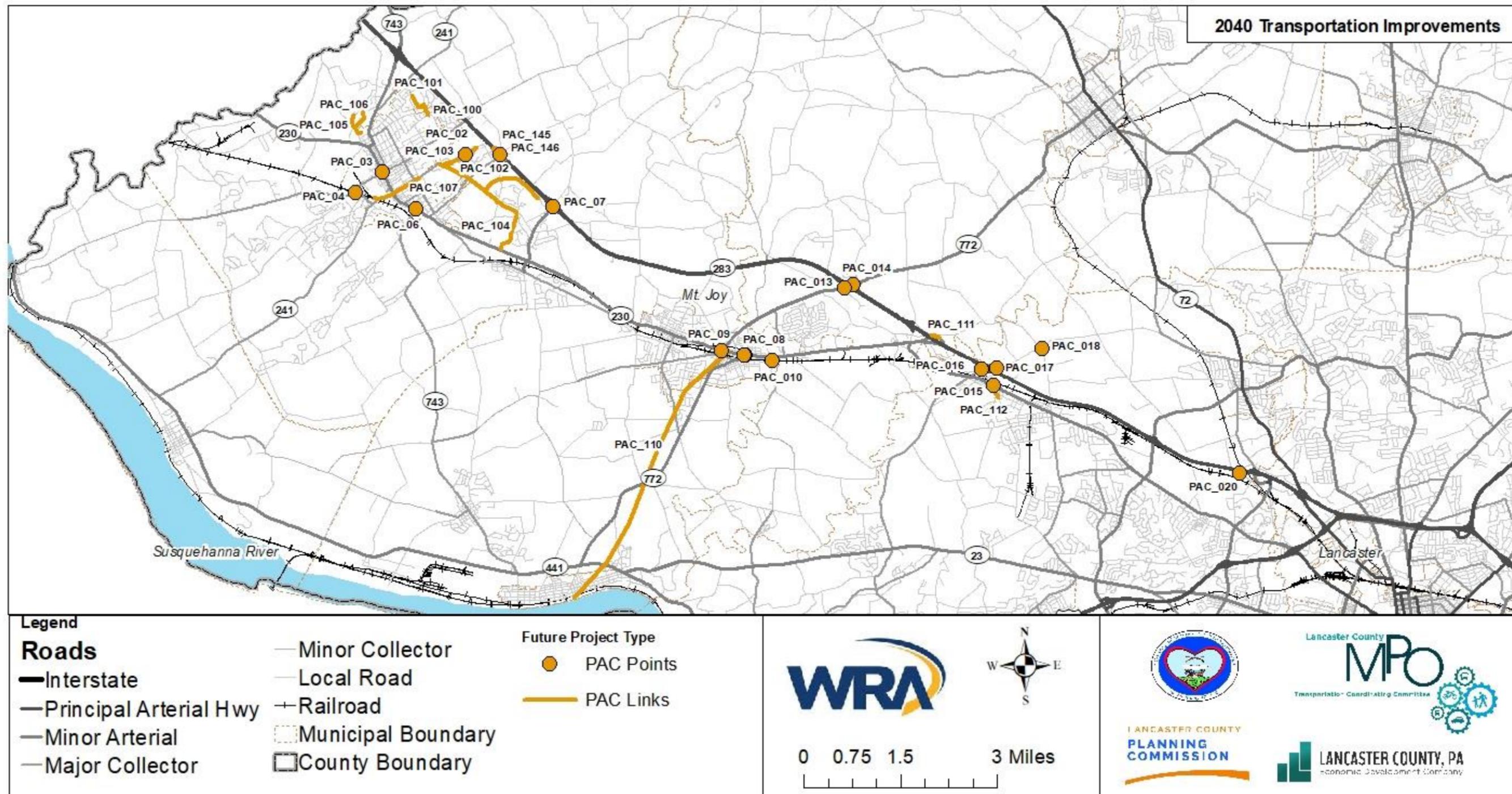




Exhibit 27 - Transportation Improvements Overview Map (PAC)





MODELING RESULTS

A balance must be struck between adding supply to the travel network and managing travel demand to maintain Lancaster's character and quality of life. In response to that, the modeling analysis included both standard measures of effectiveness for traffic congestion and walk/drive accessibility measures for each scenario. In conjunction with LCPC, EDC, and the PAC, the following measures of effectiveness were identified to compare the four scenarios:

Standard Traffic Measures of Effectiveness

- Vehicle Miles Traveled
- Vehicle Hours Traveled
- Total Hours of Delay
- Fuel Consumption
- Volume to Capacity Ratio
- Level of Service

Walk Accessibility

- Accessibility to Schools
- Accessibility to Parks and Recreation
- Accessibility to Transit
- Accessibility to Healthcare
- Accessibility to Full Service Grocery Stores

Drive Accessibility

- Travel Time to Interchange
- Fire Response Travel Times
- Police Response Travel Times
- EMS Response Travel Times
- Travel Time to Central Business Districts (Elizabethtown, Mount Joy, Lancaster)

The **Vehicle Miles Traveled** (VMT) and **Vehicle Hours Traveled** (VHT) measures are summaries of how many miles and hours are traveled by vehicles on the regional transportation network ([Exhibit 28](#)). VMT and VHT may decrease as trips become shorter as more destinations are available within a shorter driving distance, or as their route choice changes due to improvements or degradations to traffic operations.

Any time spent traveling on congested roadways or intersections that is slower than free-flow speed is considered delay. The **Total Hours of Delay** measure is calculated as the difference between the fastest time a vehicle can reach its destination at its free-flow speed with no traffic and the time it takes to reach the destination during the peak period of congestion ([Exhibit 29](#)). **Fuel consumption** also varies with distance and travel speed, and was calculated by applying fuel efficiency curves from the EPA for autos and trucks to congested travel speeds in the model ([Exhibit 30](#)).

Volume to capacity ratio (V/C) is a way of measuring the demand-to-supply of a roadway. As traffic volume on a roadway approaches its capacity, speeds decrease causing delay and congestion. Congestion on a roadway is commonly measured by a term called **Level of Service** and is related to the V/C ratio on freeway segments. Similar to letter grades in school, Level of Service worsens from "A" to "F". A Level of Service "A" is equivalent to a good, freely flowing condition. A Level of Service "F" is the most congested scenario causing significant travel delay. Images illustrating what different Levels of Service look like are below, referenced from Florida State DOT's Quality/Level of Service Handbook. [Exhibit 31](#) and [Exhibit 32](#) show Level of Service results for the four scenarios. [Exhibit 33 through Exhibit 40](#) show forecast traffic volumes and traffic congestion for the four scenarios.



Level of Service A-B



Level of Service C-D



Level of Service E-F

Source: Florida State DOT (2009) – Quality/Level of Service Handbook

Findings

With population and employment anticipated to increase in the county by 2040, the modeling results show the 2040 congestion degrading substantially with over 2 million additional vehicle miles traveled per day. SR 283 is currently serving approximately 27,000 ADT (average daily traffic) in each direction (54,000 combined); in 2040 it is forecast to increase in volume to 33,000 ADT in each direction (66,000 combined). One major consideration for a future investment from this study may be additional capacity along SR 283 through Transportation Systems Management and Operations strategies or traditional widening.

As anticipated, the selected land use scenario (2040LU1) is an improvement over the current land use scenario; reducing VMT, VHT, Delay, Fuel Consumption, and improving Volume to Capacity ratios and Level of Service at key locations along the corridors. This shows the importance of managing travel demand at the land use level. This can be accomplished at relatively low cost through sound land use planning and zoning compared to more expensive transportation investments. Although, this method is one that may take time to yield benefits, and requires decision-making consistent with municipal plans through changes in leadership over time.

Transportation System Management and Operations (TSMO) Strategies are a set of integrated strategies to optimize the performance of operations on existing infrastructure through implementation of multimodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of a transportation system. In simplest terms, TSMO is a way to address reliability, mobility, and congestion by utilizing strategies rather than only building out of congestion.

The scenario with selected land use overlaid with all transportation improvements (2040LU1T1) shows further improvements to congestion beyond the selected land use scenario. Small additional reductions are seen in VMT and VHT. These small reductions are likely due to the addition of interchanges along the SR 283 corridor that provide more direct access to destinations, but do not substantially impact the drive demand. More considerable improvements are seen in the reduction of Delay Hours (42%) from the 2040 scenario to the 2040LU1T1 scenario.



Exhibit 28 – Scenario Results - Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT)

Year	Total VMT	Total VHT
2017	12,585,294	307,411
2040	14,630,394	378,225
2040LU1	13,775,742	344,048
2040LU1T1	13,767,025	338,855

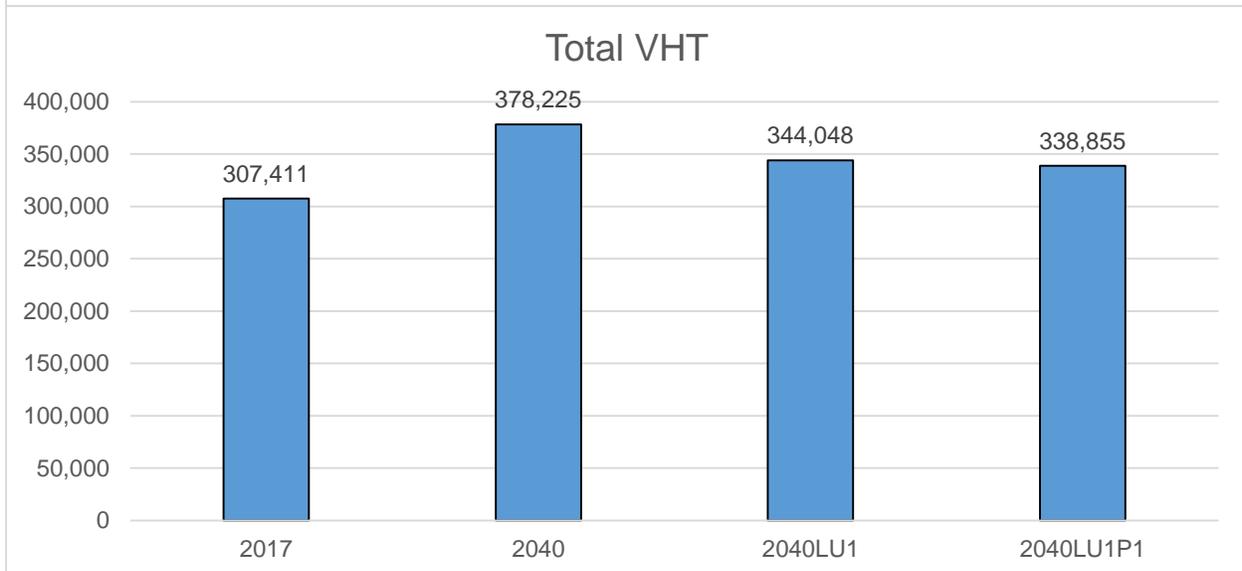
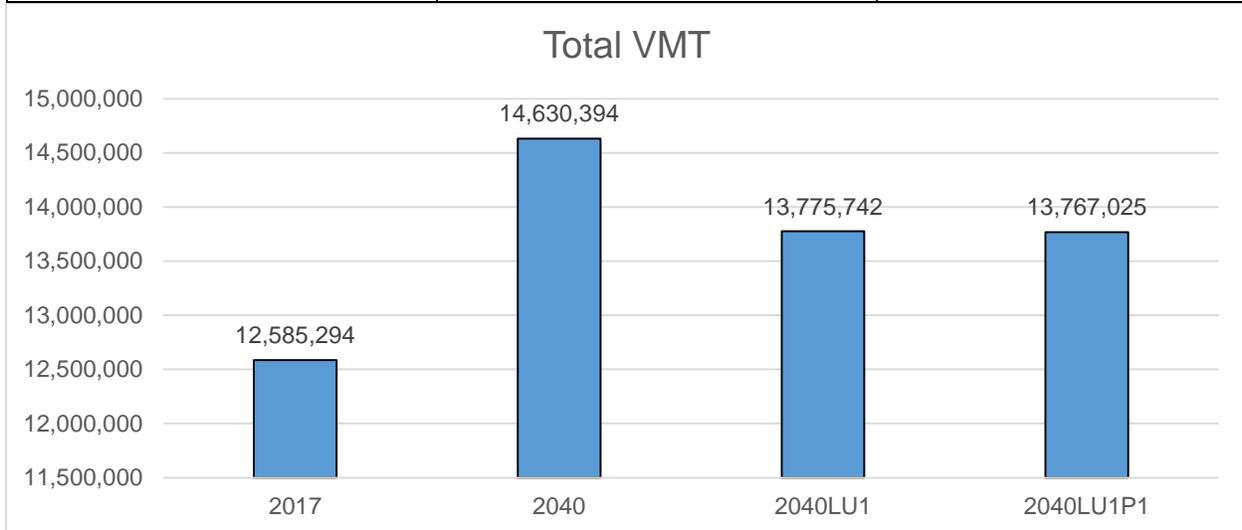




Exhibit 29 – Scenario Results – Daily Hours of Delay

Year	Delay (Hours Daily)	Fuel Consumption (Gallons)
2017	16,226	626,394
2040	39,403	737,137
2040LU1	26,899	688,709
2040LU1P1	22,685	685,794

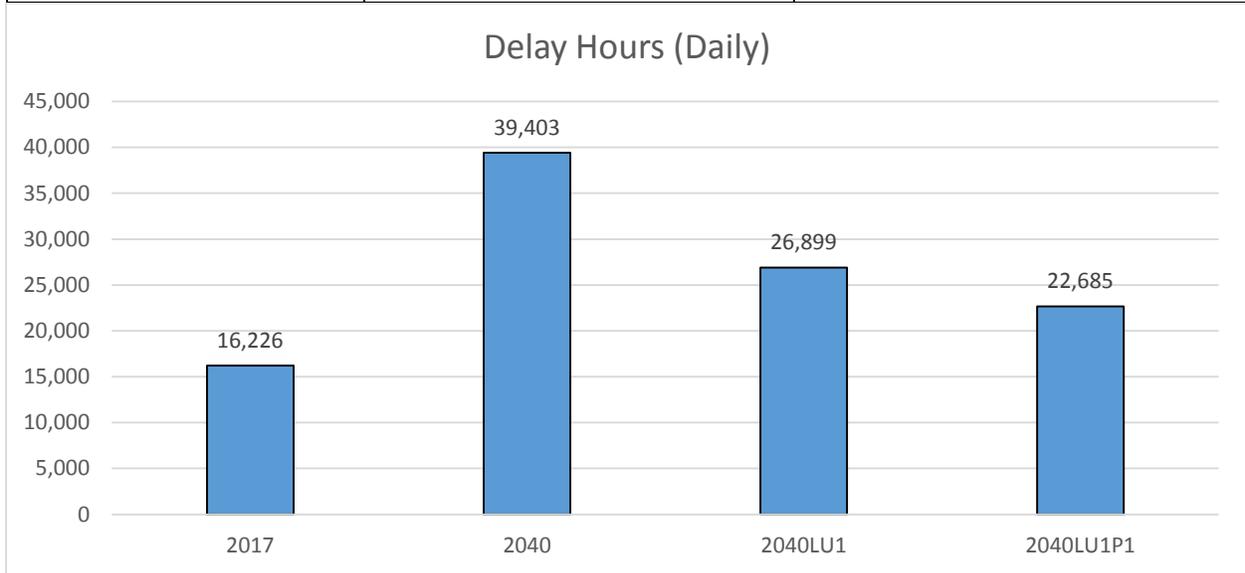


Exhibit 30 – Scenario Results – Daily Regional Fuel Consumption

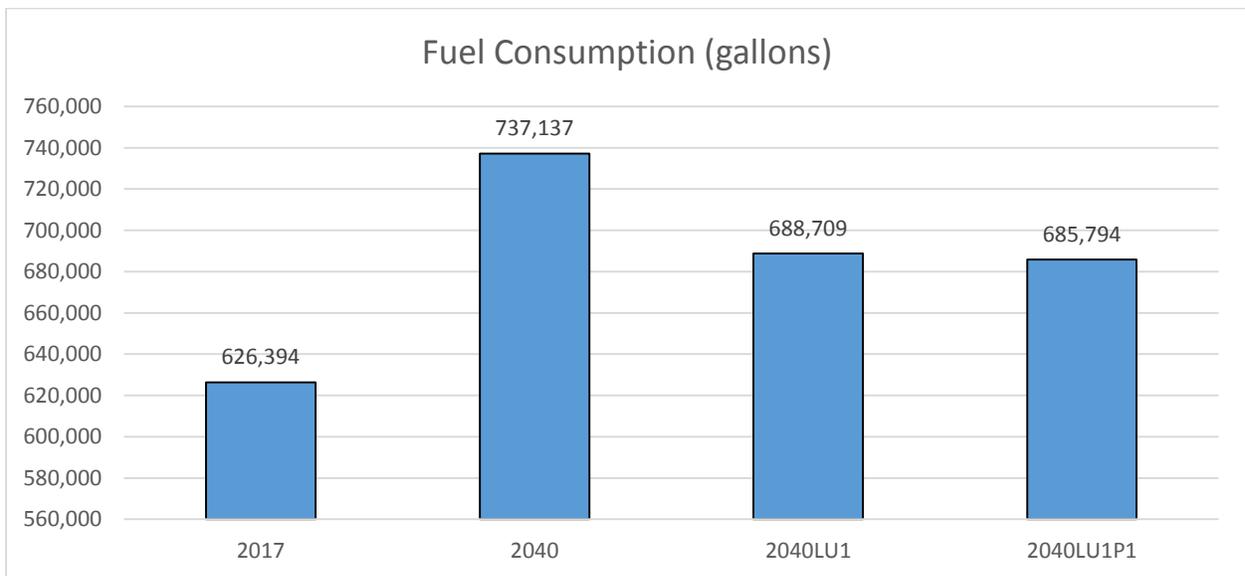




Exhibit 31 – Vehicle Hours Traveled by Level of Service (Daily)

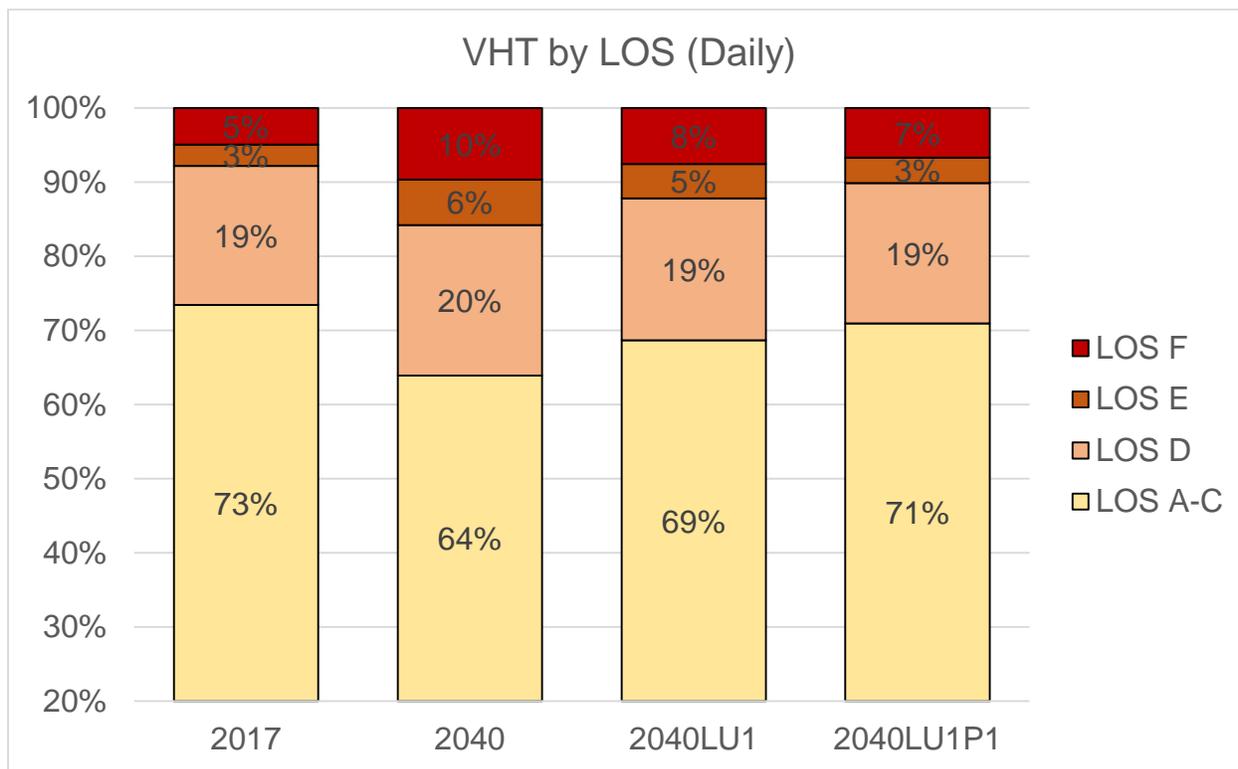


Exhibit 32 - Vehicle Hours Traveled by Level of Service (PM Peak Period)

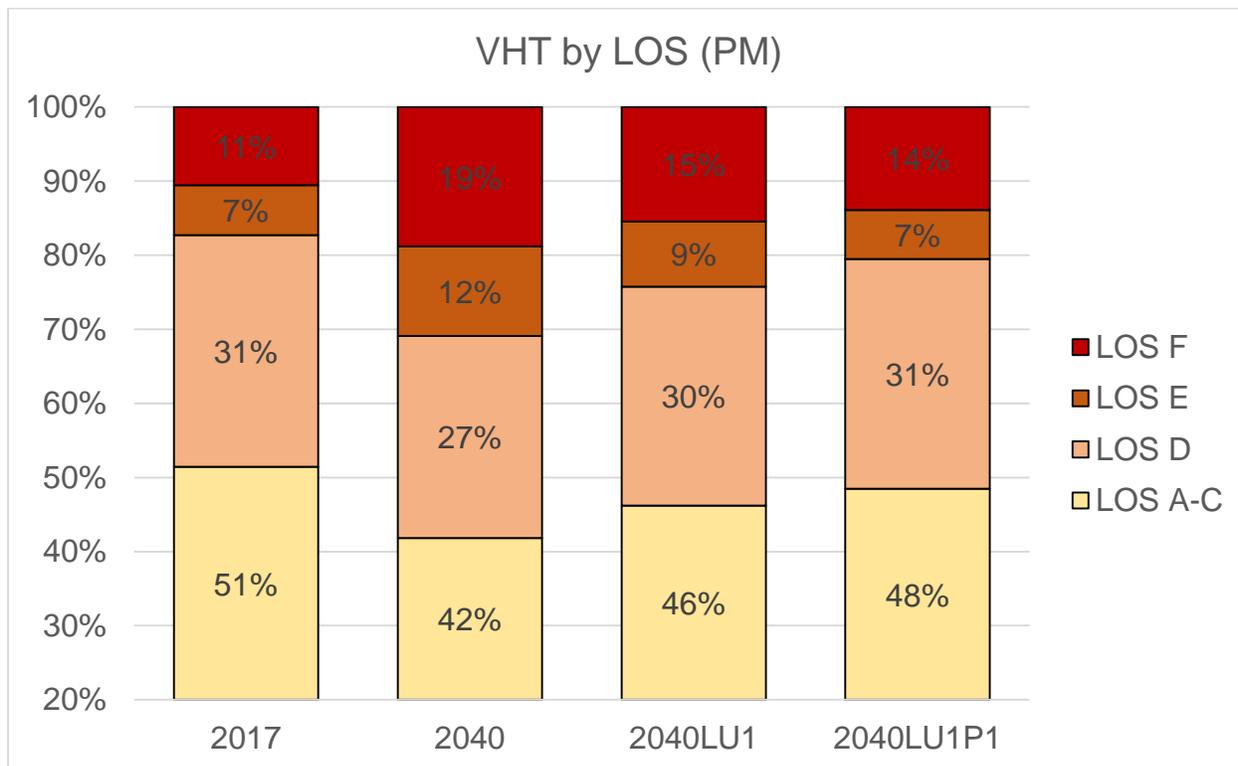




Exhibit 33 – Daily Traffic Volumes (2017)

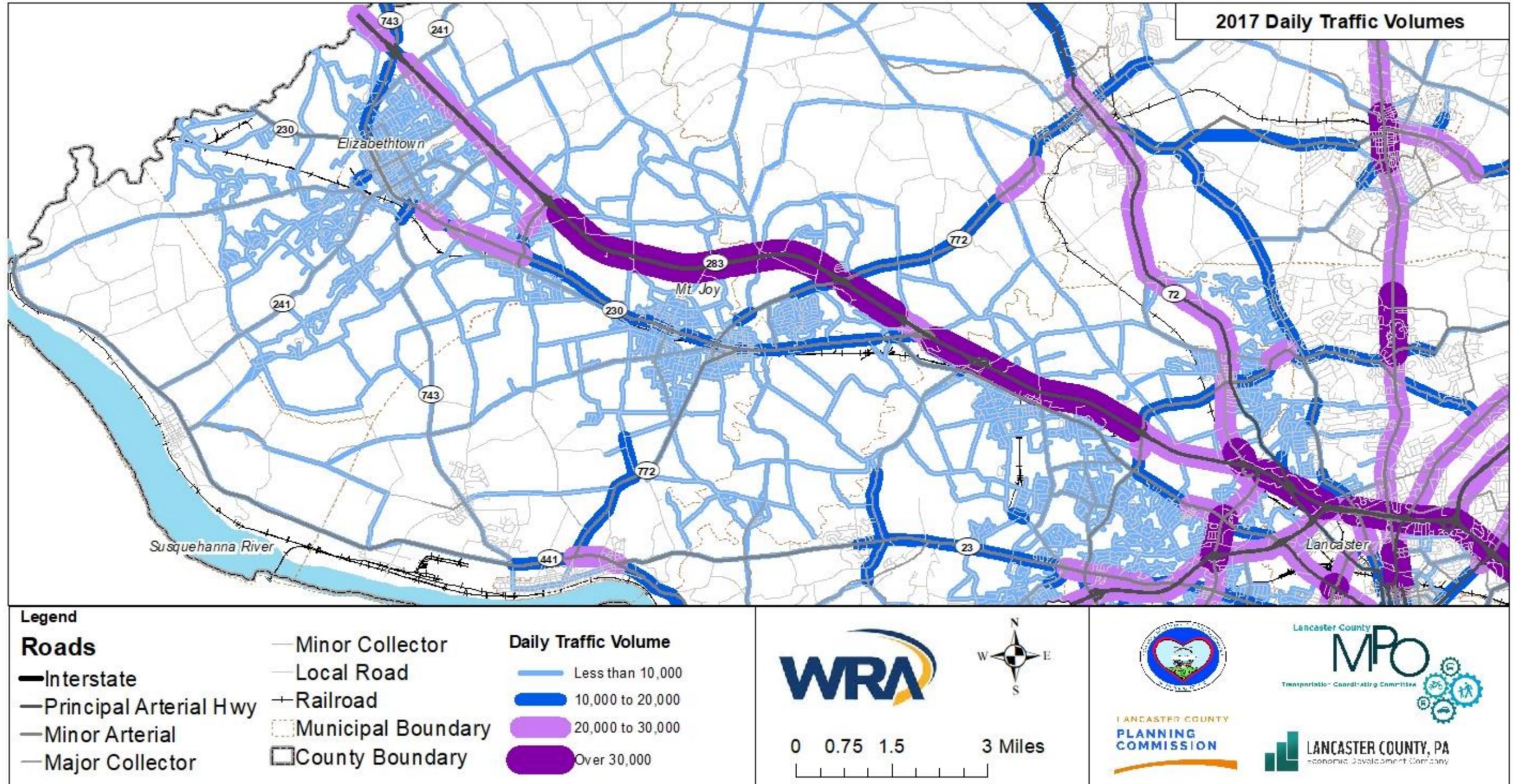




Exhibit 34 – Traffic Congestion (2017)

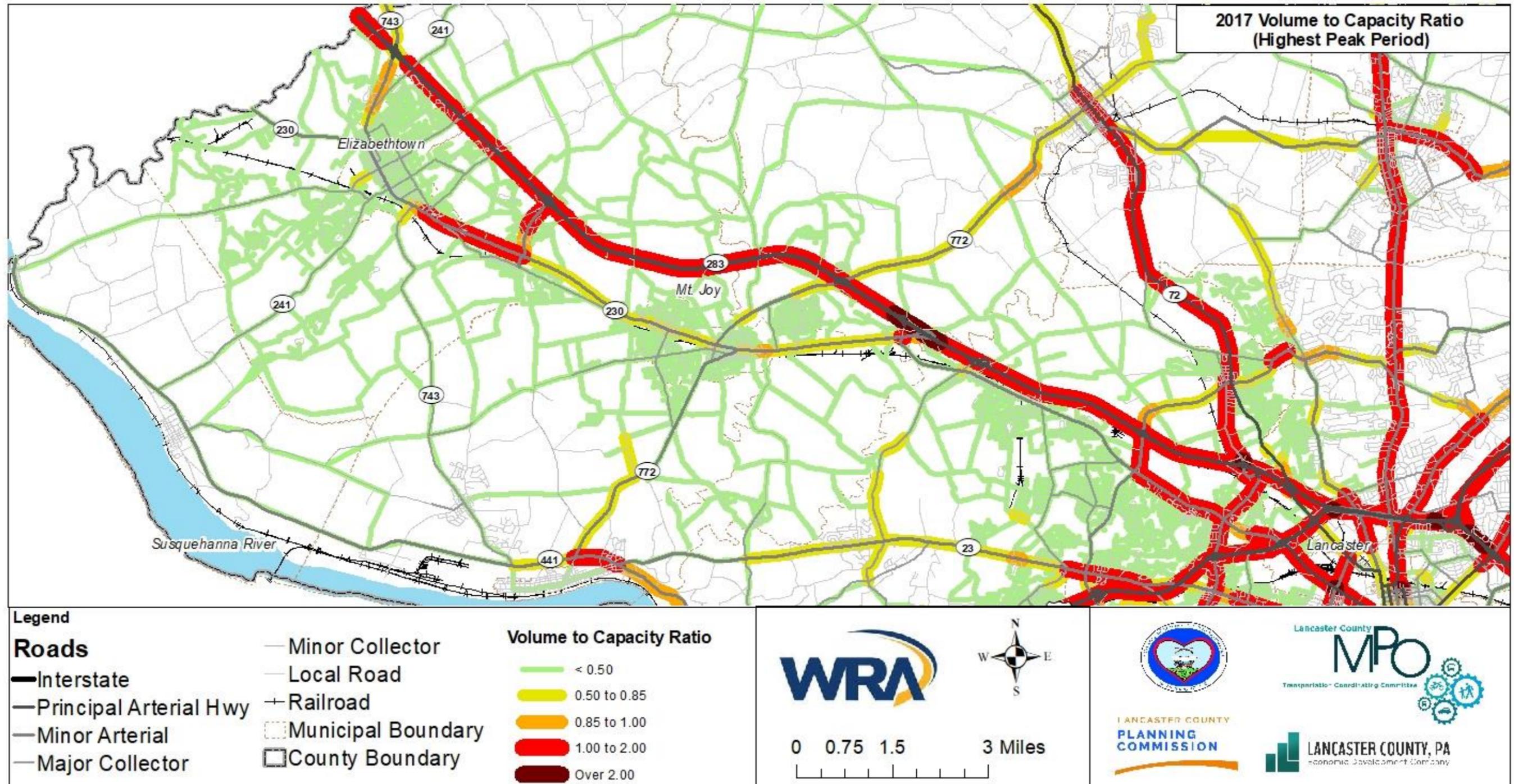




Exhibit 35 – Forecast Daily Traffic Volumes (2040)

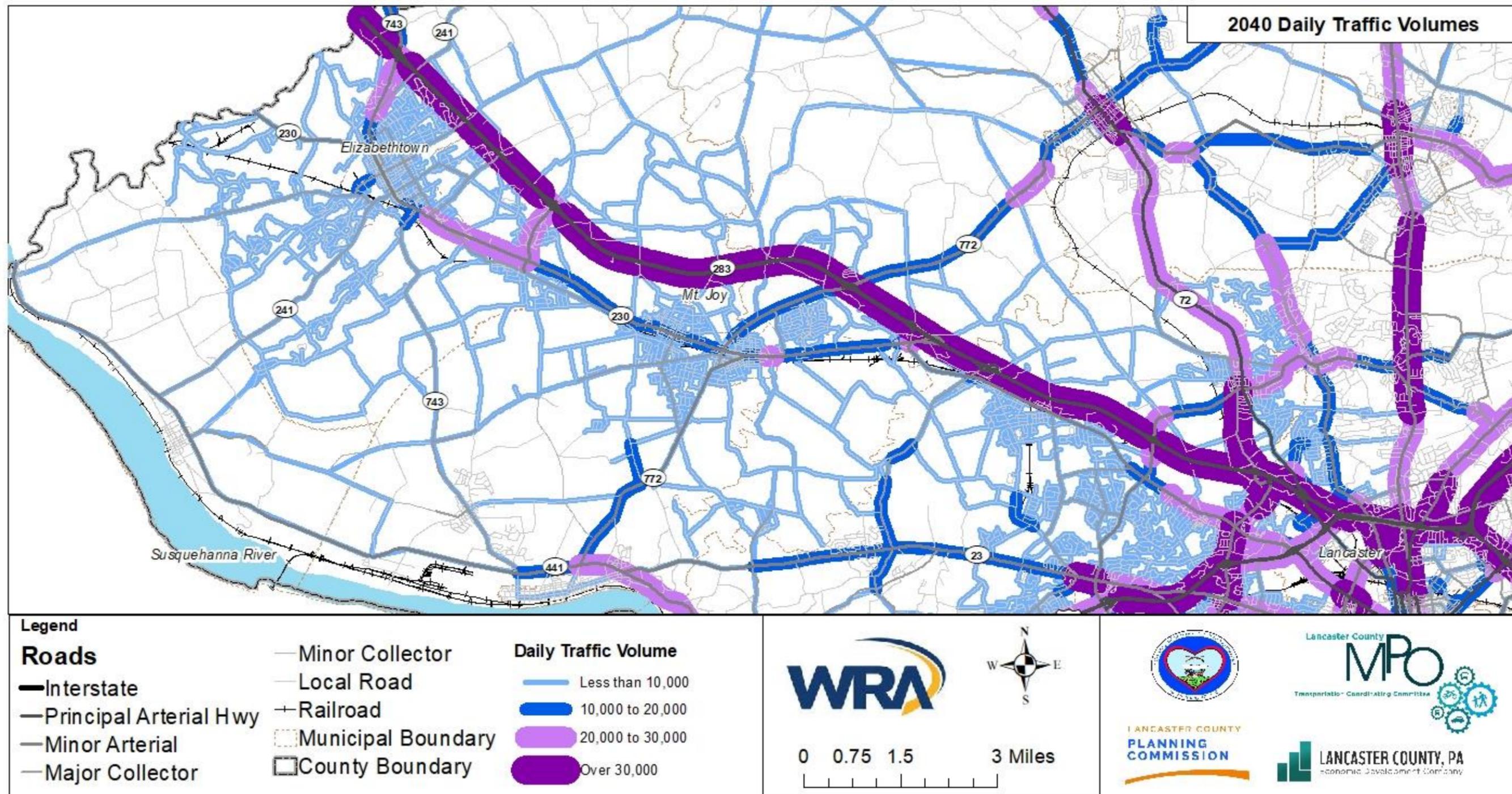




Exhibit 36 – Forecast Traffic Congestion (2040)

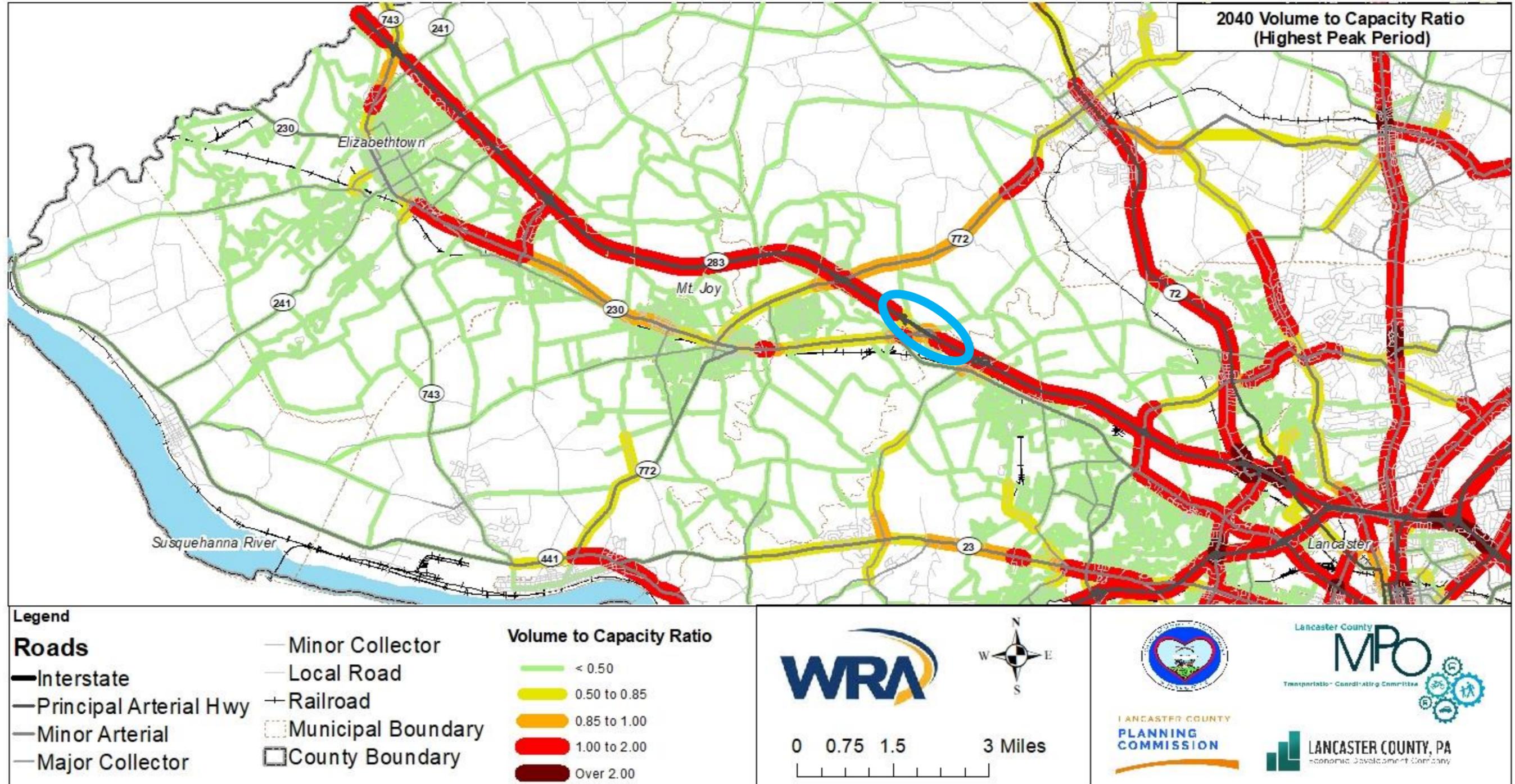




Exhibit 37 – Forecast Daily Traffic Volumes (2040LU1)

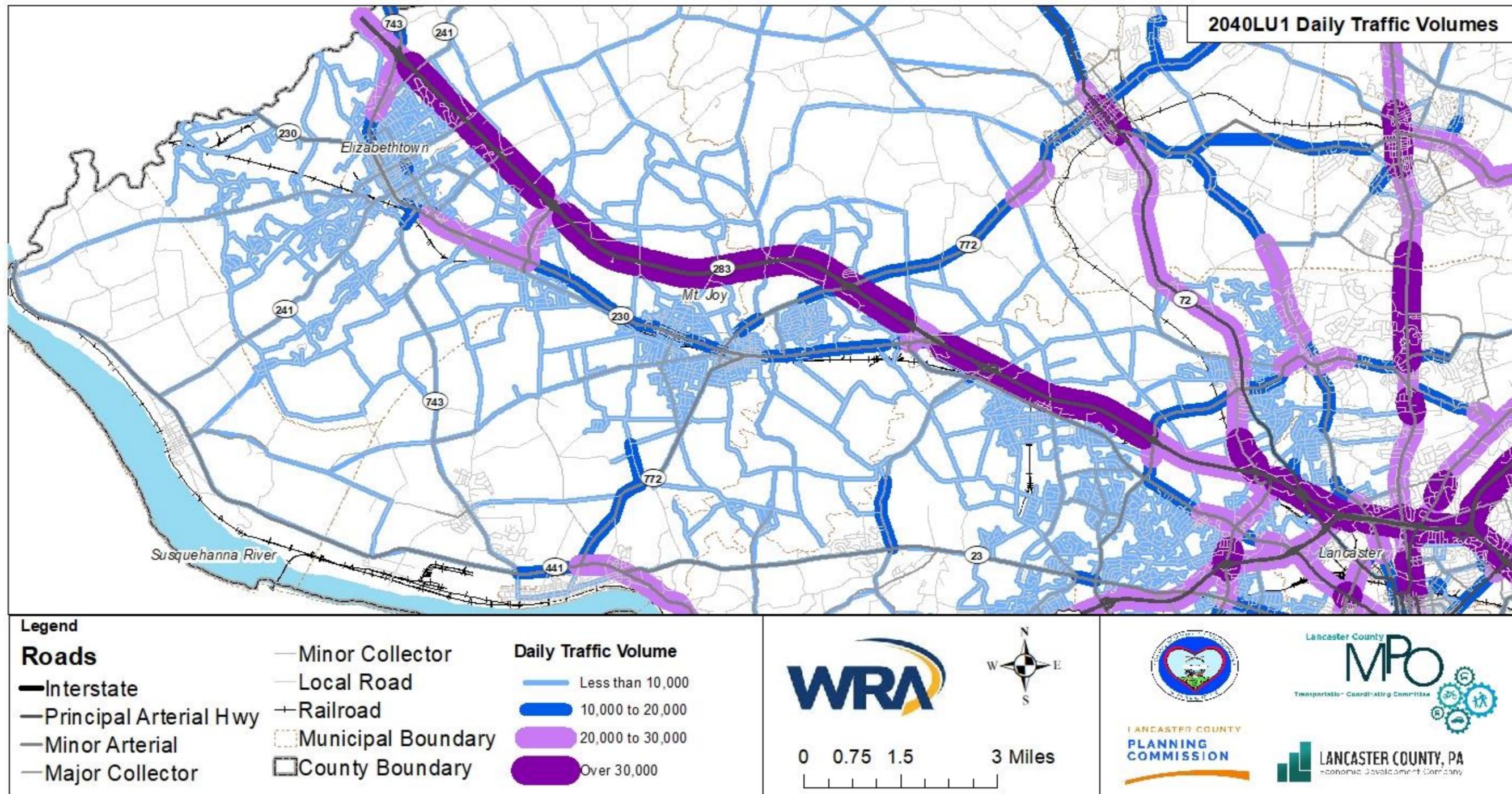




Exhibit 38 – Forecast Daily Traffic Congestion (2040LU1)

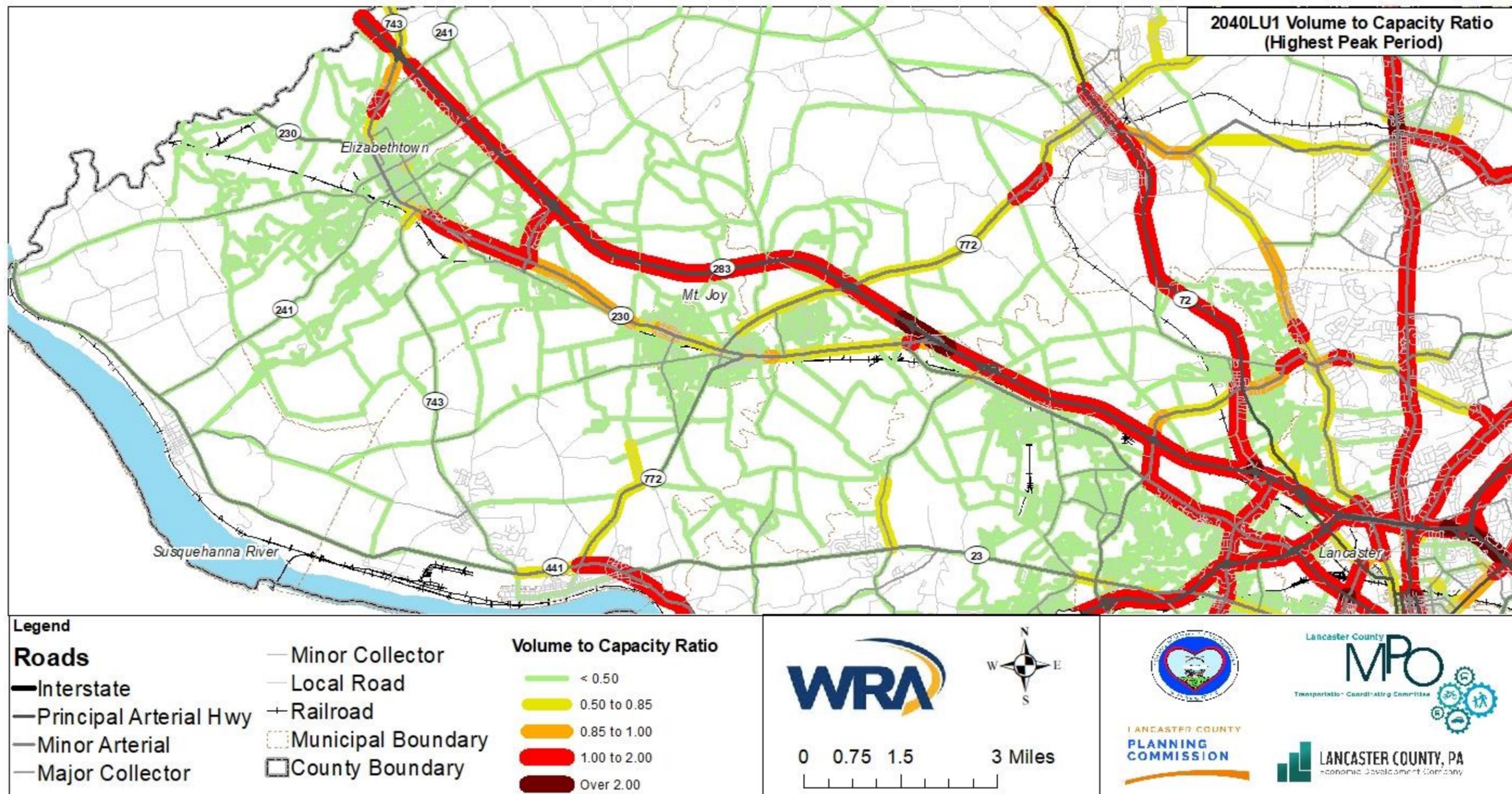




Exhibit 39 – Forecast Daily Traffic Volumes (2040LU1T1)

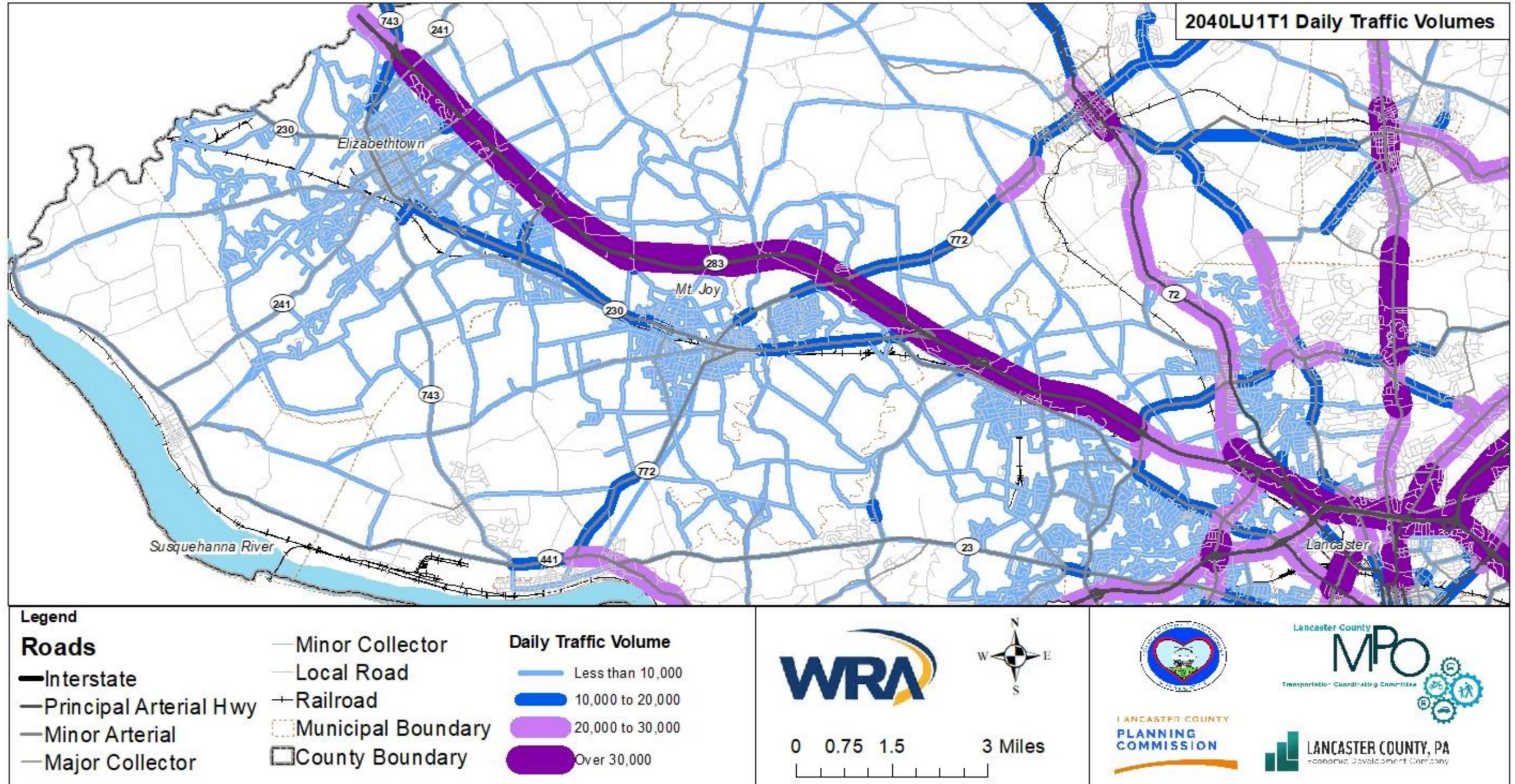
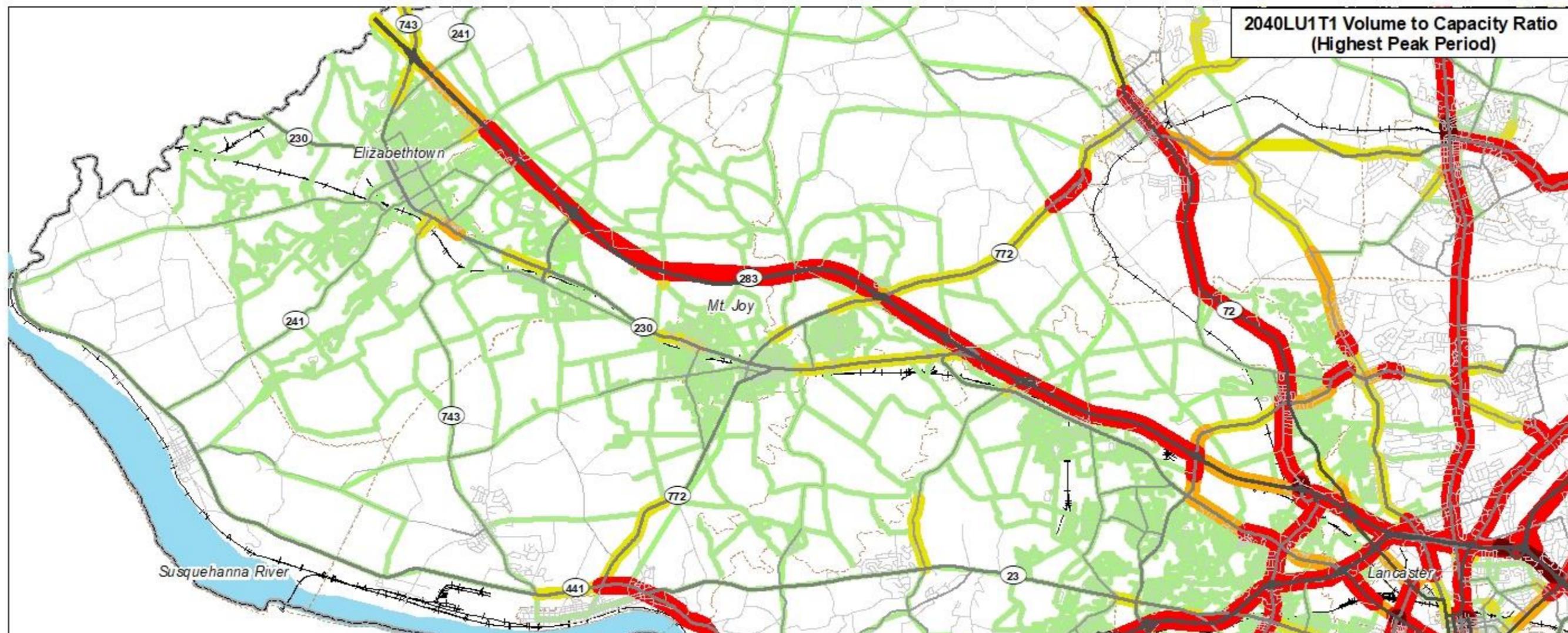




Exhibit 40 – Traffic Congestion (2040LU1T1)



2040LU1T1 Volume to Capacity Ratio (Highest Peak Period)

Legend		Volume to Capacity Ratio < 0.50 0.50 to 0.85 0.85 to 1.00 1.00 to 2.00 Over 2.00	 0 0.75 1.5 3 Miles 	 LANCASTER COUNTY PLANNING COMMISSION	 Lancaster County MPO Transportation Coordinating Committee	 LANCASTER COUNTY, PA Economic Development Company
Roads Interstate Principal Arterial Hwy Minor Arterial Major Collector Minor Collector Local Road Railroad Municipal Boundary County Boundary						



Measuring the impacts of each scenario on accessibility is important to understand how infrastructure can provide choices for all users of the transportation system to access community services such as schools, parks, transit, healthcare, and full-service grocery stores with fresh produce without needing a personal vehicle and adding to traffic congestion. Key points of interest used in the walk accessibility metrics can be seen in [Exhibit 41](#).

A 15-minute walkshed was chosen for the analysis as a reasonable distance that a person might consider walking instead of driving. At an average speed of 3 feet per second (approximately 2 miles per hour) assuming a very young or elderly individual, a pedestrian could travel about half a mile in 15 minutes.

The selected land use scenario aims to improve walkability by targeting development to areas that are already served by infrastructure, creating mixed-use developments, and co-locating beneficial uses in proximity to one another. However, the differences in 15-minute walk times are fairly minimal among the scenarios, when compared at a regional scale. Many of the individual improvements and changes in land use patterns may improve walk times, but the bigger aim is to improve accessibility and provide safe alternatives to driving through the installation of dedicated sidewalks. These facilities will also improve community safety, health, and quality of life for all users, but especially school-aged children and the elderly, by providing safe dedicated space for walking and other forms of exercise. The selected land use overlaid with transportation improvements (2040LU1T1) does show small improvements in parcel connectivity within the walkshed. One walk accessibility map is shown in this report to illustrate the analysis performed for all four scenarios; this is the Walk Access to Transit map ([Exhibit 43](#)).

Drive accessibility is important to measure how the scenarios might impact residents and business owners through modifying access to interchanges and Central Business Districts, as well as response times from police stations, fire stations, and Emergency Medical Services. Key points of interest used in the drive accessibility metrics were identified by the PAC as important considerations for development and can be seen in [Exhibit 42](#). One drive accessibility map is shown to illustrate the analysis for all four scenarios, as it is a key indicator of areas that may be suitable for economic development due to the ease of moving people and goods to the area ([Exhibit 44](#)). Drive accessibility shows travel times degrading for parcels from 2017 to 2040, but improvements can be seen in parcel connectivity in both the selected land use and transportation improvements scenarios.



Exhibit 41 – Walk Access Key Points of Interest

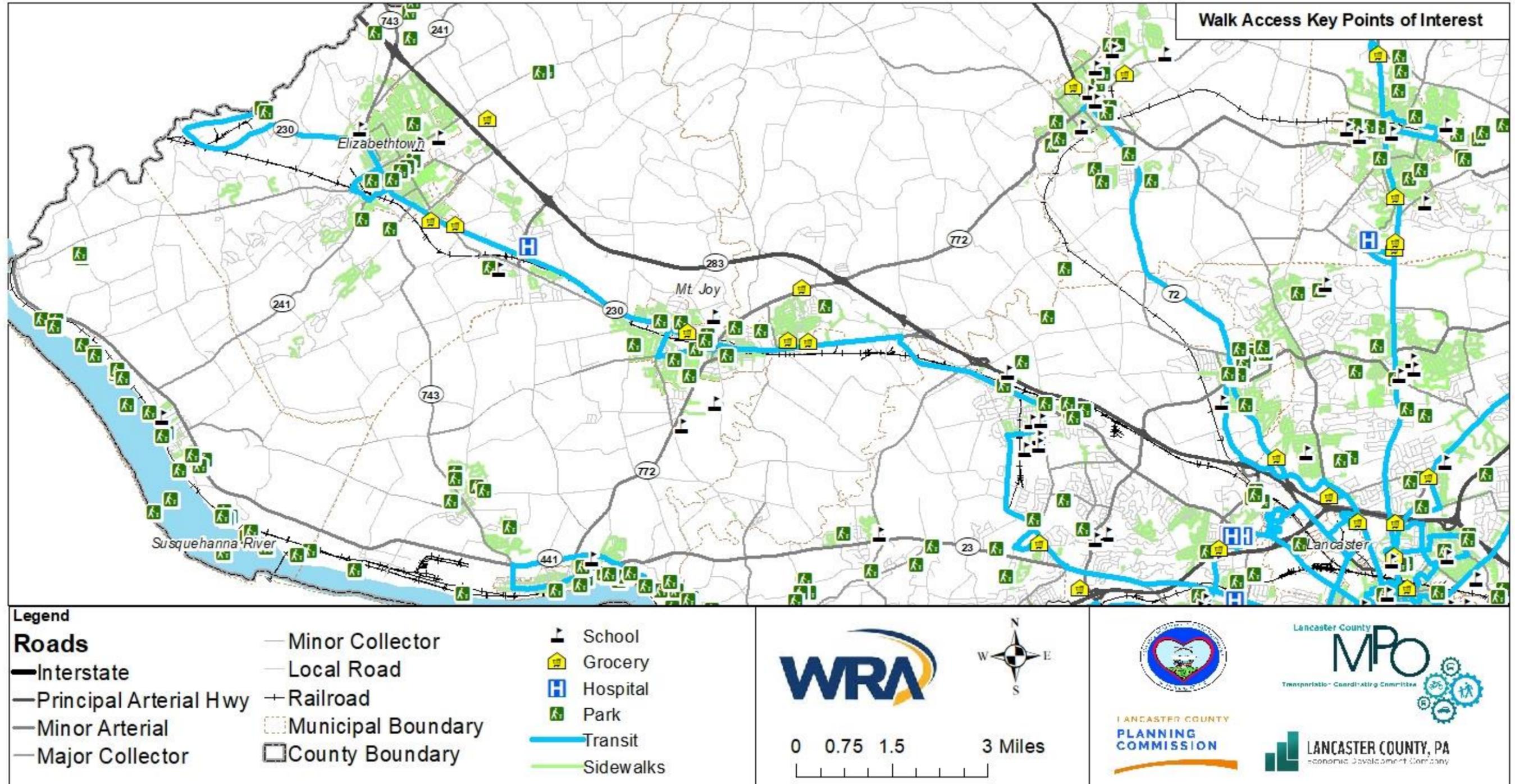




Exhibit 42 – Drive Access Key Points of Interest

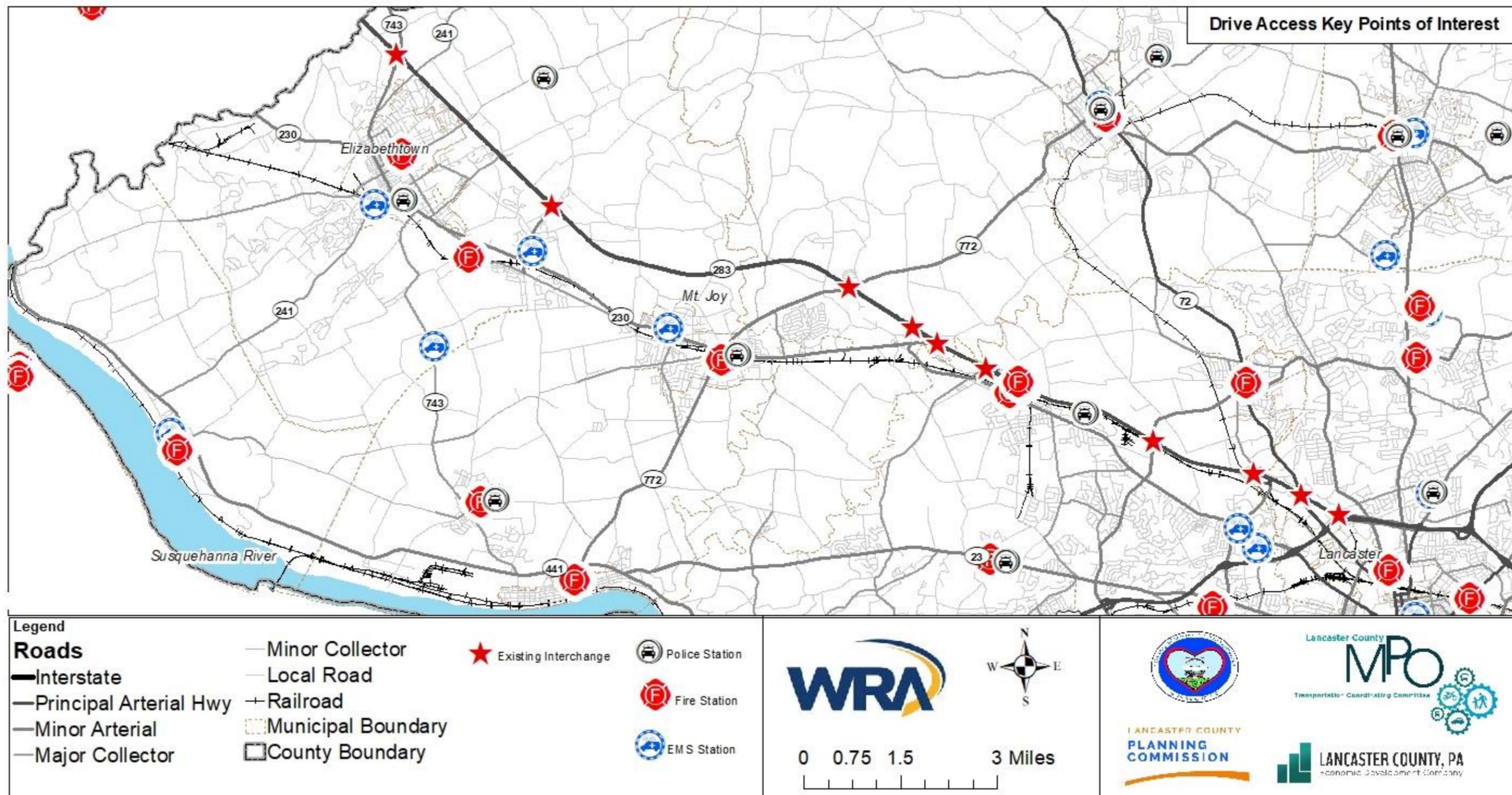




Exhibit 43 – Walk Access to Transit (2040LU1T1)

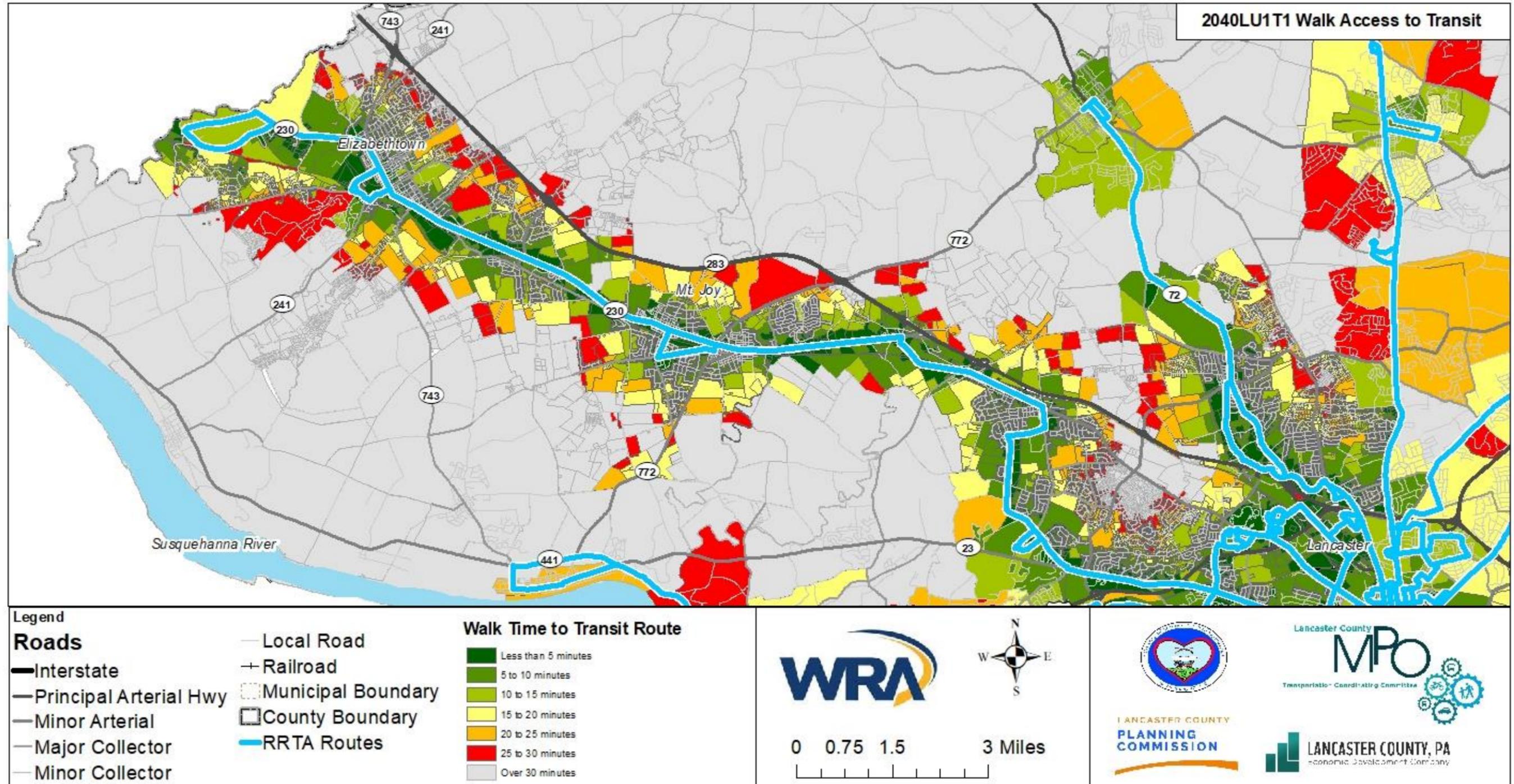
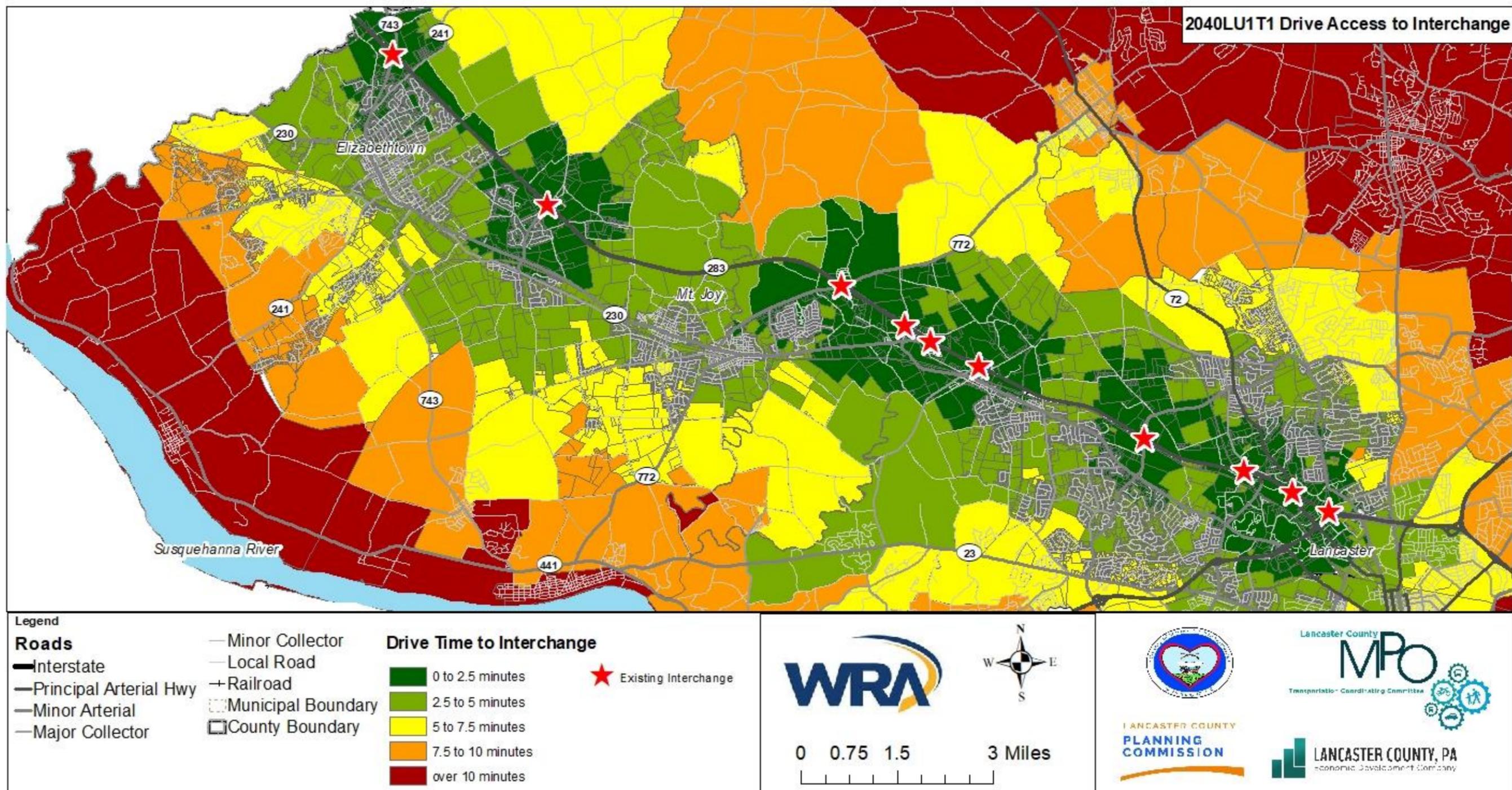




Exhibit 44 – Drive Access to Interchange (2040LU1T1)





STUDY SUGGESTIONS

It is essential to examine land use and the surrounding transportation network both comprehensively and harmoniously when developing potential strategies and improvements. Land use and the transportation network directly impact one another; therefore, it is essential that smart, fiscally responsible strategies are developed to promote sustainable growth that does not overburden the local and surrounding communities. When developing land use strategies and transportation improvements for this study, careful consideration to maintain a balance between future growth and leveraging existing infrastructure was applied to ensure sustainability and compliance with the principles in *places2040*.

LAND USE AND ZONING CONSIDERATIONS

Encouraging proper land use and appropriate zoning within the corridor can reduce stresses on the transportation network and ultimately provide benefits to the transportation system as a whole. Strategic zoning and land use can also encourage economic growth and intelligently utilize existing infrastructure or create economically viable scenarios for the expansion of infrastructure systems like water and sewer. The following land use and zoning considerations would be supportive of the County's vision outlined in *places2040* and would assist in achieving the future growth objectives of this study.

Zoning

- **Mixed-Use** - Consider zoning changes to mixed-use for parcels scoring high for both residential and commercial.
- **Co-location** - Consider locating high-density residential near commercial or light industrial uses to minimize automobile trips for both employees and customers to and from commercial/industrial sites.
- **Transit Oriented Development** - Consider transit-oriented development when providing for potential large mixed-use developments to make the extension of transit service more effective.

Water & Sewer

- **Targeted growth** - Target expanding water and sewer access to areas zoned for high density residential, commercial, mixed, and industrial uses.
- **Coordination** - Collaborate with water and sewer providers to increase water and sewer capacity to parcels zoned high density residential, commercial, industrial, and mixed-use within the UGA that are adjacent existing interchanges along SR 283.
- **Future needs** - Consider future water and sewer needs to immediate, adjacent parcels if additional interchanges are constructed along SR 283.

Infill Development

- **Parking** - Consider easing parking requirements in infill locations.
- **Flexibility** - Consider modifying or establishing flexible building codes to expand development potential of priority infill parcels.
- **Parcels of unique size and shape** - Create land assemblage for larger parcels; identify small urban commercial parcels that are flexible for development; consider approaching land owners to purchase, subdivide, and sell fragmented parcels (i.e. parcels that are not contiguous, separated into 3 or 4 parts, or divided by public right-of-way like a roadway). Examine the zoning of these types of parcels to market them to adjacent landowners as separate parcels or have the municipality or county consider purchasing to develop into dedicated green spaces, storm water gardens, micro parks, or beautification areas. Alternative potential uses could be considered for these fragments including residential tiny houses, ice cream stand, or coffee hut.



Housing

- **Densify** - Conduct further analysis to assess urban core sites that could help to achieve higher densities per acre than 7.5 for residential development within urban cores of the UGAs, in order to meet the countywide target average of 7.5 units/acre.

Trails

- **Community trails** - Consider rail trails and local community parks along thin, narrow parcels that are unsuitable for other types of development.
- **Land Assemblage** - Approach local trail groups and municipalities to gauge interest for land assemblage to build trail connections.

POLICY CONSIDERATIONS

Local, regional, state, and federal policy are the foundational building blocks to successfully implementing many of the study's suggestions. The following policy suggestions were developed to better support these objectives and encourage strategic improvements to the transportation system.

Municipality Policy Recommendations

1. **Traffic Impact Fees** - Where not already in use, such as in Mt. Joy Township, consider establishing Transportation Impact Fee ordinances to assist in paying for transportation improvements that new developments may necessitate.
2. **Traffic Impact Studies** - Require traffic impact studies on all local roads when developments exceed the thresholds defined in PennDOT's Transportation Impact Studies guidebook.
3. **Zoning changes** – Review the parcels listed in this study for zoning re-evaluation and talk to property owners and developers about marketability of land with and without the zoning change.
4. **Consistency across municipalities** – Achieve consistency in zoning regulations and development rules within the corridor to maximize benefits across municipal boundaries
5. **Densify** – Achieve the density goals established within *places2040* for UGAs in the corridor.
6. **Intersection correction** - Develop an Intersection Control Evaluation (ICE) policy or ordinance to eliminate and/or correct offset, dog-legged, or skew intersections by requiring roadway owners to justify intersection design and installation of traffic control strategies (i.e. stop controlled, traffic signals, and roundabouts).
7. **Sidewalks** - Where not already required, require sidewalks along all new roadways within UGAs; this is particularly critical in locations surrounding residential parcels adjacent to commercial or industrial parcels; adopt a regional sidewalk network vision, and future-focused approach to the pedestrian network. Require all new residential developments to include internal sidewalks.
8. **Wide shoulders for bikes and buggies** - Require wide shoulders on designated bicycle state routes, heavily traveled plain sect community roads, or routes identified as important bicycle routes in the County's Active Transportation Plan. This approach has been successfully implemented in other locations to simply provide extra width to allow traffic to safely overtake bicycles and buggies, or to provide a dedicated bicycle lane.
9. **Housing** – Encourage affordable housing and senior housing in areas with adequate non-motorized infrastructure.

County and EDC Policy Recommendations

1. **Facilitate multi-municipal agreements** - Facilitate multi-municipal access management areas and zones to control the number of driveways, intersection spacing, and building setbacks on important corridors within UGAs and the study area.
2. **Target growth** – Target growth within the 1,300 urban growth area parcels as outlined in *places2040*. Furthermore, narrow the focus to more specifically target the growth to the 312 UGA parcels that are likely to be suitable for different uses needed by 2040 from this analysis.



3. **Mixed-Use** - Larger developable parcels that have potential for mixed-use development should seek proposals for innovative mixed-use designs; these parcels should be developed carefully in accordance with *places2040*, with all opportunities and challenges considered before going forward
4. **Preservation** – Limit large-lot suburban development in the rural areas outside of the UGAs within the corridor to ensure minimal loss of high quality farmland and natural lands.
5. **Incentivize developers** - Develop an expedited permitting strategy that will make approvals much quicker for developers who conform to the county and municipal comprehensive plans and strategies outlined in this report; consider providing incentives to those who build multimodal infrastructure
6. **Pursue funding** – Pursue funding to eliminate the transportation system restrictions to development of sites. Choose projects from this study and new projects as needed and fund small, focused feasibility studies with clear recommendations and cost estimates that can be used for project applications.
7. **Facilitate resources** – Perform regular meetings with municipalities to identify opportunities and resources for public improvements such as Department of Community & Economic Development (DCED) programs and PennDOT transportation funding sources that are often overlooked; tell them about state programs and assistance and incentives that are available and assist with the application process.
8. **Public services** – Coordinate with water and sewer service providers, as well as internet service providers to ensure that there is public water, public sewer, and high-speed internet service to attract development to the area.

TRANSPORTATION IMPROVEMENT CONSIDERATIONS

Transportation improvements considered through discussions with the PAC and as part of the modeling analysis will influence travel in the corridor. A careful balance must be struck with any of the transportation improvements and land use changes, as they influence one another.

Securing funding and implementing major transportation improvements, such as roadway capacity-adding or interchange projects will bring development pressure as new parcels are made more accessible to the interstates and surrounding areas. To offset the vehicular-based demand, multimodal projects should be implemented to reduce traffic demand, provide safe routes for residents and students to walk to work, shopping, or school, and provide separated walk-bike facilities that promote public health in active communities and enhance the quality of life for residents.

All of the initial transportation projects identified by local stakeholders and the project team in *Exhibit 24* were evaluated to determine which projects best achieve the goals of this study while considering limitations in transportation funding. The transportation improvements listed in *Exhibits 45-47* are the projects that have been identified as best achieving the goals of this study and maintaining fiscal responsibility. These transportation improvements should be planned and programmed as the study area continues to develop in conjunction with those already listed on the TIP and planned through municipal traffic studies. All improvements are needed to achieve the congestion reduction, accessibility, and land use needs discussed in the Modeling Results section. To assist in prioritizing needs identified, a planning timeframe (short-term 0-4 years

Exhibit 45, mid-term 4-10 years

Exhibit 46, and long-term 10-20+



Exhibit 47) was assigned to each individual needed improvement. The suggested transportation improvements are coded as follows:

- CAP – Suggested improvements as a result of the capacity analysis for the 2040 Selected Land Use Scenario
- SW – Sidewalk/trail improvements as a result of the accessibility analysis between neighborhoods, groceries, schools, and employment centers
- TRN – Transit service improvements as a result of 2040 Selected Land Use and transit accessibility analysis
- PAC – Project Advisory Committee suggested improvements

Exhibit 45 – Short-term Suggested Transportation Improvements

Improvement ID	Improvement Name/Description
CAP_03	Internal shared driveway for industrial sites between Cloverleaf Road and Main Street
CAP_13	Improved access management to industrial sites via driveway sharing
CAP_14	Industrial site near Cloverleaf Road /Main Street - Access management driveway - Right in, right out
CAP_16	Potential signal on E Main Street to consolidate entrance points between Elmcrest Boulevard and Cornerstone Drive in Mt. Joy Borough
CAP_20	Traffic signal upgrades and retiming on SR 230 from Linden Avenue in Elizabethtown Borough to Cloverleaf Road in Mt Joy Township
CAP_21	Traffic signal upgrades and retiming on SR 230 from Angle Street to Elmcrest Boulevard in Mt Joy Borough
SW_4	Sidewalk along Sheaffer Road from new potential mixed use development driveway to S Mt Joy St to connect to grocery store and shops
SW_5	Sidewalks in Rheems on W Harrisburg Avenue and Colebrook Road to schools
SW_6	Rheems sidewalk extensions
SW_9	Elizabethtown Borough sidewalk improvement program
SW_14	Anderson Ferry Road from Koser Road to Union School Road Donegal Jr High sidewalk
SW_17	Sidewalks near Lancaster General shops at Spring Valley Road and McGovernville Road
SW_26	Church Street sidewalk to Landisville Schools and Sports Complex
SW_27	Sidewalk along Centerville Road from Marietta Avenue to Harrisburg Pike
SW_33	Sidewalk along E Main Street from Mt Joy Borough line toward Sheetz in Mt Joy Township
SW_37	Sidewalk extension along Masonic Drive / SR 241 to Amtrak Station Elizabethtown
SW_38	Sidewalk extension along Development Drive to connect to Amtrak
PAC_03	Implement all-pedestrian phase for school crossing at Market Street and High Street in Elizabethtown Borough
PAC_06	SR 230/SR 743 intersection improvement to enhance turn movements for trucks
PAC_013	Signalize SR 283 West/SR 772 Intersection
PAC_014	Signalize SR 283 East/SR 772 Intersection
PAC_015	SR 283 East/Spooky Nook Road create T-intersection by realigning ramps
PAC_018	Landisville Road/Spooky Nook Road intersection safety and operations improvement
PAC_100	Complete sidewalk gap on Northfield Drive to Buckingham Boulevard
PAC_101	Complete sidewalk gap on Radio Road to Northfield Drive to Buckingham Boulevard
PAC_102	Add sidewalk on Bear Creek Road to Bear Creek School (South)



Improvement ID	Improvement Name/Description
PAC_103	Add sidewalk on Bear Creek Road to Bear Creek School (North)
PAC_106	Add sidewalk connection to cul-de-sac neighborhoods between Hillside Road and Indian Rock Circle to connect neighborhoods to Mill Road Elementary School

Exhibit 46 – Mid-term Suggested Transportation Improvements

Improvement ID	Improvement Name/Description
CAP_04	Access road along SR 230 for industrial cluster driveway sharing
CAP_05	Shreiner Station Road new bridge alongside preserved covered bridge
CAP_18	Maintain covered bridge at Erisman Road
SW_1	Path to Park City Mall along Shreiner Station Road
SW_3	Sidewalk along Maytown Avenue (SR 743) from new potential mixed use development driveway south of railroad bridge to Market Street
SW_8	Sidewalk on Cloverleaf Road from commercial to residential
SW_11	Sidewalk to Bear Creek School and along Ridge Road overpass to Darrenkamps Elizabethtown Market
SW_13	Complete SR 230 commercial gaps in sidewalk network within Mt. Joy Borough
SW_15	Anderson Ferry Road SR 772 sidewalk connection to High School
SW_16	Sylvan Road large residential sidewalk connection
SW_19	Harrisburg Avenue sidewalk or sidepath from McGovernville Rd to existing sidewalk between Camp Meeting Rd and Elmwood Avenue near Landisville
SW_20	Stony Battery Road connections from Marietta Ave to Corporate Blvd between residential and commercial
SW_21	Sidepath to Hempfield Schools from residential development at Meadow Creek Dr
SW_25	Kauffman Road sidewalk to Hempfield High School
SW_31	Sidewalk extension along Spooky Nook Road over SR 283 overpass
SW_32	Sidewalk connection along Cornerstone Drive in Mt Joy Township
SW_34	Colonial Crest Drive / McGovernville Road connection to East Hempfield Parks
SW_35	Pinkerton road sidewalk from Marietta Avenue to Donegal Schools
TRN_1	Transit line extension down Harrisburg Pike to Industrial Park
PAC_02	Bear Creek Road/Spring Road safety improvement project to improve sight distance
PAC_04	Improve height-restricted bridge for trucks on W. High Street near the Elizabethtown Rail Station
PAC_07	Redesign SR 283/Cloverleaf Road interchange including improvements for geometry limits, capacity, and truck access
PAC_08	SR 230/SR 772 (East) intersection improvement/realignment to improve turn movements for trucks (SR 772 to SR 230)
PAC_09	SR 230/SR 772 (West) intersection improvement/realignment for a better connection (SR 772 to SR 230)
PAC_016	SR 283/Spooky Nook Road interchange capacity improvement
PAC_017	SR 230/Stony Battery Road eliminate intersection skew and increase capacity
PAC_020	Improve drainage or provide additional access for businesses on Dairy Road to resolve flooding issues



Improvement ID	Improvement Name/Description
PAC_104	Multimodal improvements on Campus Road from Schwanger to College Avenue including sidewalk and wider shoulders between Schwanger Road and Merts Drive
PAC_105	Add sidewalk along Mill Road and Lakeview Drive to Mill Road Elementary School to connect neighborhoods to school
PAC_107	Bike improvements along College Avenue including a bike lane, shared-use, or wide shoulders
PAC_112	Stony Battery Road improvements from Main Street to Brandt Boulevard

Exhibit 47 – Long-term Suggested Transportation Improvements

Improvement ID	Improvement Name/Description
CAP_17	Shreiner Station Road maintain covered bridge as pedestrian pathway
SW_2	Pedestrian bridge from mixed use development over railroad tracks to Elizabethtown
SW_7	Sidewalk or sidepath along SR 230 and Cloverleaf Road - Rheems to Elizabethtown
SW_10	Sidewalk extension over SR 283 at E High Street
SW_12	Sidewalk along Mt Joy Road
SW_18	Sidewalk on McGovernville Road from Spring Valley Road to Park City Apartments at Swarr Run Road
SW_22	Sidewalk along Manheim Pike north of SR 283 to Commercial Avenue
SW_23	Sidewalk along Manheim Pike under and south of SR 283 to US 30
SW_24	Manheim Pike sidewalk extension south of US 30 to Prince Street
SW_28	Dillerville Road bridge sidewalk connecting residential to Manheim Pike
SW_39	Masonic Village sidewalk extension along SR 241, Masonic Drive, and Turnpike Road railroad underpass to Elizabethtown
TRN_2	Transit line extension to mixed use properties, potential transit oriented development off of SR 230
TRN_3	Transit line extension down Anderson Ferry Road near high school and high density residential
PAC_010	Improve bottleneck and height restriction for Joy Ave under railroad
PAC_110	Bike connection/trail from Mt Joy Borough to Northwest River Trail
PAC_111	SR 283 West Off-Ramp connection to Auction Road improvements

Additional major infrastructure improvements were examined during the land use and transportation analysis. These improvements were typically complex and potentially cost intensive investments that rely on new infrastructure in contrast to those in

Exhibit 45 through

Exhibit 47 which leverage existing infrastructure. The improvements identified below were not included due to the uncertainty of future development and potentially significant costs associated with the improvement. However, these improvements should be considered in future Metropolitan Transportation Plan updates, and during the regular TIP update cycles to determine if there is a need to add a project to address congestion and accessibility within the study area.



Highway

- **Traffic Management Improvements along SR 283** - Continue to monitor development within the region and traffic operations along SR 283. Consider implementing Transportation System Management Operations (TSMO) strategies along SR 283 as V/C ratios exceed 1.0 and LOS E outside the AM and PM peak periods. Examples of potential strategies to alleviate congestion include ramp metering, hard-shoulder running, freeway service patrols, and travel demand management by providing commuters with highway, transit, and passenger rail travel times in real-time via dynamic message signs and mobile applications so the transportation system user can make more informed travel decisions.
- **Interchanges along SR 283** - Continue to monitor development and congestion within the area and conduct a more detailed evaluation to determine the possible effects of additional interchanges along SR 283 on improving connectivity/access between SR 283 and urban growth areas under a range of future development scenarios. A new interchange may alleviate congestion along parallel routes such as SR 230 and improve operations at near-by interchanges.
If new interchanges are considered, it is important for a direct connection to be provided over or underneath the Keystone Corridor Rail Line to provide connectivity with urban centers to the south.
- **Access management along SR 230** - Improve access management along SR 230 through the use of shared driveways, inter-parcel connections, and establishment of minimum signal spacing requirements to maximize existing capacity along SR 230. Current municipal ordinances should be evaluated to determine if these types of alternative designs are permitted, and where they are not, recommend model ordinance language for municipal use.
- **Spooky Nook Interchange** - Consider a new connection from Landisville Road to Spooky Nook Sports Complex improving secondary access to Spooky Nook Sports Complex and connecting the Lancaster Junction Trail.
- **Upgrade bridges and tunnels** - Replace deteriorating overpasses and underpasses to remove height and weight restrictions; replace with standard vertical clearance, at least two-lanes in each direction, as well as sidewalks or wide shoulders for pedestrians and cyclists.

Transit

- **Park and Rides** - Consider designated park and ride facilities at high volume interchanges along SR 283 and provide express service from park and ride lots to major urban centers along the corridor.
- **Future Transit Routes** - Continue to reevaluate transit routes and schedules where pockets of high density residential, commercial, mixed use, and industrial development occur.
- **Existing Facilities** - Continue to enhance transit facilities and infrastructure to improve customer experience and potentially attract new riders by alleviating congestion along SR 283 and SR 230.

Passenger Rail

- **Passenger Rail Study** - Based on the results of the selected land use scenario and potential transportation impacts, periodically evaluate passenger rail habitude to identify policies, strategies, and future infrastructure needs to encourage rail ridership in lieu of automobile travel within the study area, in particular SR 283. This effort should also consider interconnectivity with South Central Transit Authority and all potential TSMO strategies to be deployed along SR 283 as discussed previously under highways.

Trails

- **Regional connectivity** - Connect the regional trail system along the river. Continue to connect the existing pedestrian and bicycle network to regional trails, such as the Lancaster Junction Trail, the Conewago Recreation Trail, and the Northwest Lancaster County River Trail. Connect Salunga



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and Landisville to the Lancaster Junction Trail with bike lanes and sidewalk via Spooky Nook Road and Landisville Road.

- **Crossing beyond SR 283** - Consider incorporating pedestrian/bicycle and trail connections over or under SR 283 during replacement or rehabilitation of existing structures.
- **Neighborhood Connectivity** - Continue to add sidewalks to connect residential areas with schools, shopping, community facilities, parks, and to provide internal neighborhood connections.



CONCLUSION

Lancaster County is a growing community determined to preserve its strong agricultural heritage through good land use planning, while accommodating economic growth opportunities and pursuing transportation improvements to alleviate congestion. The willingness and openness of local municipalities and members of the Project Advisory Committee to participate in this study with the Lancaster County Planning Commission and Economic Development Company of Lancaster County is a promising start toward implementing a strategy for the SR 283-280 corridor's sustainable economic development.

Land use and zoning policies, regulations, and transportation investments co-mingle to influence the characteristic of an area; it is paramount to balance these considerations to maintain Lancaster County's community fabric, to continue to enhance residential quality of life, and to bring jobs and tax revenue to the corridor. The study recommends a re-evaluation of zoning ordinances for select parcels to encourage appropriate growth that benefits the community, municipality, and developer. This study also recommends roadway capacity-adding transportation improvements and multimodal transportation improvements, with an aim to increase safety, decrease congestion, enhance quality of life, and extend the long-term viability of the region.

As the corridor attracts new residents and employment in the coming years, the land use scenario considerations and transportation recommendations in this study should be examined at regular intervals to identify that they still meet the County's changing needs. The strategies and investments outlined in this report are meant to be flexible and to be applied as-needed. It is recommended to maintain open channels of communication between municipal leaders, the County, and EDC to continue along the path of economic development set in motion through this plan.



APPENDICES

- PAC Meeting Summaries
- Meeting Minutes

Walk Accessibility Metrics (Parcels within 15 minute Walkshed)

Metric	Mode	Point of Interest	Minutes	2017	2040	2040LU1	2040LU1P1
Parcels	Walk	Park	<=15	12,560	12,560	12,560	12,547
Parcels	Walk	School	<=15	3,423	3,423	3,423	3,798
Parcels	Walk	Transit	<=15	17,418	17,418	17,418	17,612
Parcels	Walk	Hospital	<=15	770	770	770	786
Parcels	Walk	Grocery	<=15	3,774	3,774	3,774	3,768
Parcels	Walk	Retail	<=15	25,400	25,400	25,400	25,429

Drive Accessibility (Parcels within 10 minute Driveshed)

Metric	Mode	Point of Interest	Minutes	2017	2040	2040LU1	2040LU1P1
Parcels	Drive	Interchange	<=2.5	6,278	5,640	5,992	7,369
Parcels	Drive		<=5	22,641	21,888	22,174	22,949
Parcels	Drive		<=7.5	26,618	26,450	26,559	26,628
Parcels	Drive		<=10	27,404	27,403	27,403	27,405
Parcels	Drive	Central Business District	<=2.5	6,543	6,513	6,517	6,679
Parcels	Drive		<=5	13,002	12,810	12,860	13,088
Parcels	Drive		<=7.5	16,821	15,787	16,397	16,445
Parcels	Drive		<=10	23,204	21,780	22,775	22,865
Parcels	Drive	Fire	<=2.5	13,524	13,338	13,553	13,809
Parcels	Drive		<=5	26,436	25,860	26,131	26,193
Parcels	Drive		<=7.5	27,405	27,405	27,405	27,405
Parcels	Drive		<=10	27,407	27,407	27,407	27,407
Parcels	Drive	Police	<=2.5	9,014	8,319	8,952	9,324
Parcels	Drive		<=5	21,492	20,248	21,221	21,199
Parcels	Drive		<=7.5	26,564	25,918	26,338	26,318
Parcels	Drive		<=10	27,407	27,407	27,407	27,407
Parcels	Drive	EMS	<=2.5	10,170	9,964	10,090	10,235
Parcels	Drive		<=5	23,113	21,920	22,545	22,588
Parcels	Drive		<=7.5	27,364	26,895	27,283	27,265
Parcels	Drive		<=10	27,407	27,407	27,407	27,407

- Parcel scorecard results for industrial, commercial, residential and agriculture
- Parcel rankings on maps for industrial, commercial, residential and agriculture
- TIP projects