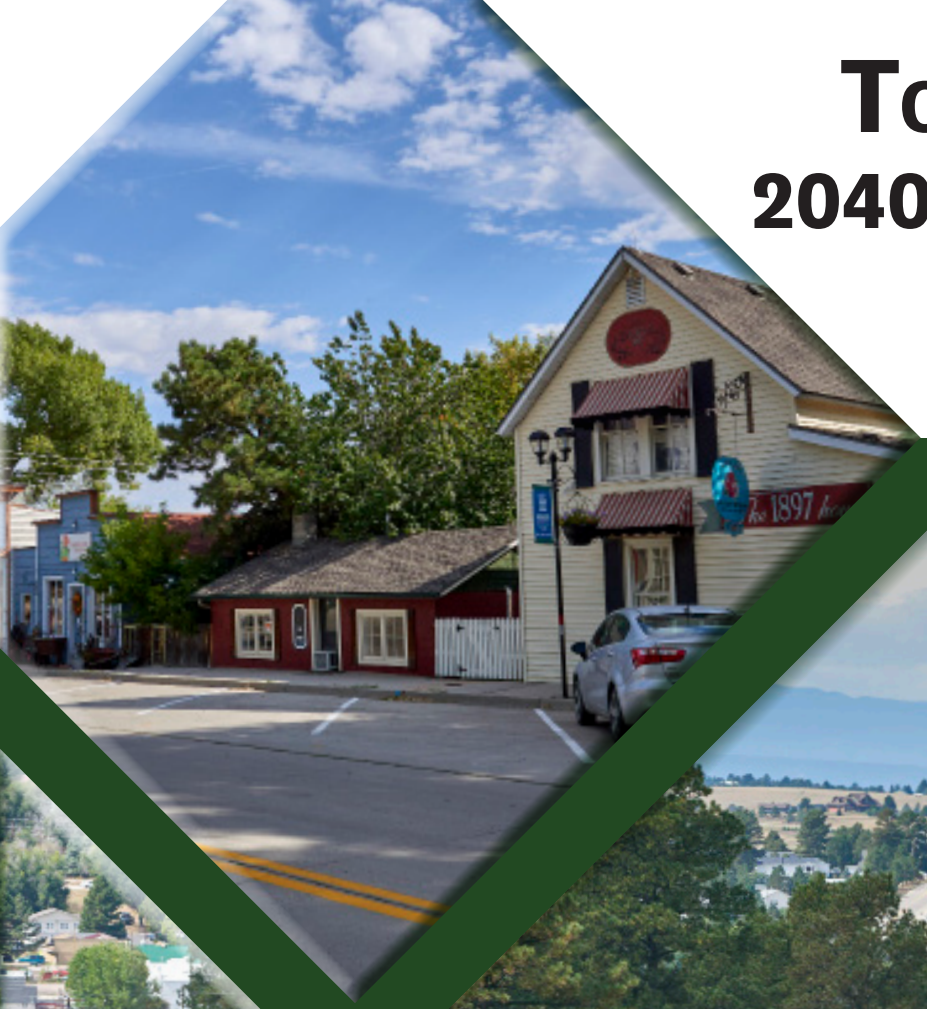
Town of Elizabeth
2040 Transportation Plan



February 2020

ELIZABETH
COLORADO

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Appendices

Introduction and Intent

The Town of Elizabeth is located in western Elbert County, Colorado, approximately 45 miles southeast of Denver. The Town was founded in the 1890's, with deep roots in the agricultural industry. The surrounding area of unincorporated Elbert County has seen steady population growth in the last 10 years, increasing by approximately 290 people per year. Much of this population growth in Elbert County is occurring within 3 miles of the current Town boundary. State demographers predict that this population growth will significantly accelerate in the coming years. This type of population growth and associated land development pressure has increased demand on the existing transportation infrastructure. Unaddressed, this increased travel demand will eventually result in service failures throughout the systems. A framework for identification of new routes and expansion of existing routes is critical to promoting logical Town growth. The combination of new, expanded, and other existing routes will form the future transportation network which will address travel demand and can be developed over time, as demand necessitates.

The transportation plan is a long-term planning document that defines potential roadway and multimodal connections. The plan is a living document which is anticipated to be revisited and amended incrementally over time. Colorado State Statutes, Title 31, Article 23, Part 2, provides for the creation and adoption of a transportation plan as part of a Town's comprehensive plan. In particular, this transportation plan has worked closely in concert with the recently adopted December 2019 Town of Elizabeth Comprehensive Plan, particularly in terms of land use. This transportation plan identifies the existing and potential locations, alignments, and types of current and proposed roadways and trails and provides the Town with a mechanism for pursuing and preserving land for these proposed alignments. Indeed, a transportation plan can be adopted and/or amended by the Planning Commission at any time.

Existing Planning Efforts

In order to compile relevant data and ensure coordination with concurrent transportation and land use planning efforts, a number of recent and ongoing transportation and land use studies and plans in the region were examined. Key takeaways from each document as they pertain to the Town of Elizabeth 2040 Transportation Plan have also been noted.

- **Town of Elizabeth Street Plan (2008)** – This is the most recent document which identifies the locations, alignments, and types of existing and proposed streets in the Town. The Street Plan includes land within three miles of the Town limits in 2008.

  Key Takeaways:
  - Widening of CO 86 is necessary to accommodate current and future travel demands.
  - Development is required to provide transportation improvements in accordance with the Street Plan, as appropriate.

- **Town of Elizabeth Comprehensive Plan (2019)** – The Comprehensive Plan serves as an advisory document for future growth and development of the Town and surrounding areas. It outlines the vision of the Town for future land use, parks and open space, transportation, and utilities. The Comprehensive Plan also focuses on the vision and goals of the community for the Old Town area, historic preservation, tourism, and resiliency with regard to natural disasters and other shocks to the community.

  Key Takeaways:
  - Set forth goals, policies, and actions related to the transportation network in the Town and surrounding areas.
  - Established a recommended future land use plan for the Town and planned areas of growth.
  - Developed a parks, recreation, open space, and trails plan.

- **West Elbert County Transportation Master Plan (2008)** – This plan focuses on the western half of Elbert County, which includes the Town of Elizabeth. This planning effort was created separately from a countywide plan as growth and development trends were recognized to be very different in the western half compared to the eastern half of Elbert County. The plan addresses socioeconomic trends through the planning horizon year of 2030. Furthermore, the plan recommends policy, funding, roadway development, and multimodal strategies for western Elbert County.

Key Takeaways:

- Missing transportation connections exist in the County. These missing connections increase travel time and limit travel options for commuters. Existing road networks are overburdened as a result.
- Suggested several new roadway connections including, but not limited to:
  - CR 1 (Delbert Rd) extension from Singing Hills south to Hilltop Rd
  - Singing Hills extension east from CR 29 to Kiowa-Bennet Rd
  - CR 154 extension east from CR 13 to CR 17
  - CR 154 extension east from CR 29 to Kiowa-Bennet Rd
  - CR 146 extension east to Kiowa-Bennet Rd
  - CR 9 extension north from CR 9/15 to Legacy Cir
  - Continuous CR 122 from CR 9 east to CR 45

- **Douglas County 2040 Transportation Master Plan (2019)** – Douglas County abuts on the west side of Elbert County. The primary purpose of the 2040 Transportation Master Plan (TMP) was to define a long-range vision for a multimodal transportation system that offers more choices in how people travel in Douglas County. The TMP evaluates the existing status of the road network, including congestion levels and physical condition, projects for future demands based on pending and projected growth and development trends, and integrates recent transportation planning efforts.

  Key Takeaways:

  - CO 86 should be widened to two lanes in each direction from Enderud Blvd / High Points Rd east to the Douglas/Elbert County line.
  - CR 1 (Delbert Rd) should extend from Singing Hills Rd south to Hilltop Rd with two lanes in each direction.
  - CR 1 (Delbert Rd) should be widened to two lanes in each direction from Singing Hills Rd north to County Line Rd.
  - Singing Hills Rd should be widened to two lanes in each direction from Hilltop Rd to CR 1 (Delbert Rd).

- **Arapahoe County 2035 Transportation Plan (2010)** – This plan serves as a strategic plan to provide guidance to the decision-makers in developing the transportation system within Arapahoe County. This plan also serves to identify alternatives/options and provide input to the decision-makers regarding the local and the regional implications of transportation system alternatives, help in developing short and long term strategies for implementation, consistent with area land use plans developed by the County, and have a primary focus on areas and roadways within unincorporated Arapahoe County with the emphasis being eastern Arapahoe County.

Key Takeaways:

- Transportation goals in Arapahoe County, much like Elbert County, vary significantly from the eastern compared to the western half of the county.

- **CO 83 / CO 86 Access Control Plan (2006)** – This plan provides a comprehensive roadway access control plan for CO 83 between the Douglas/Arapahoe County Line and Russellville Rd and CO 86 from the west ramp intersection of I-25 to approximately 1 mile east of Elbert CR 134. This plan was a joint effort between multiple agencies including the Town of Castle Rock, Douglas County, Elbert County, the Town of Elizabeth, the Town of Kiowa, and the Town of Parker.

  Key Takeaways:

  - This plan depicts locations of current, potential, and approved (when warranted) traffic signals and restricted access intersections on CO 83 and CO 86. Any deviation of access conditions from the ACP must be submitted as an amendment to the ACP, requiring a voting process including the appropriate affected agencies.

- **CO 83 / CO 86 Corridor Optimization Study (2004)** – This corridor optimization plan includes CO 83 and CO 86 from E-470 in Parker to CO 105 in El Paso County, and from Castle Rock to Kiowa.

  Key Takeaways:

  - Several new County road connections within the core of Elbert and Arapahoe Counties, many helping to relieve traffic demands on CO 83 and CO 86, including new connections that cross jurisdictional boundary lines
  - Widening CO 86 from Castle Rock to Kiowa to address current and anticipated capacity needs
  - Preserve multiple east-west corridor alignment options in and near Elizabeth, providing for high demand in an already congested and constrained location
  - Safety-related improvements, including shoulder widening and additions, and intersection modifications along CO 83 and CO 86

- **Local Agency Safety Study (2017)** – CDOT performed a safety assessment for the Town of Elizabeth in July of 2017 that included field inspection as well as an investigation of 5 years of crash data.

  Key Takeaway:

  - CO 86 experiences higher than expected crash rates when compared to similar highways.

Overall, a few consistent themes run through the documents mentioned above.

- A significant amount of population growth is expected in and around the Town of Elizabeth.
- CO 86 should be widened from approximately CO 83 to Kiowa.
- Additional regional roadway connections are needed to provide resiliency and to help distribute traffic demands.

Existing Conditions

In order to understand how transportation is provided to the Town residents, an inventory of the existing transportation network was performed. This is an important part of the planning process since it becomes the starting point in identifying areas in need of improvement. The roadway inventory includes a collection of data associated with the existing roadway network and the compilation of recent traffic counts recorded by the Town, Elbert County and the Colorado Department of Transportation (CDOT). In addition to the roadway network, the inventory includes a multimodal inventory including bicycle and pedestrian, transit, and freight accommodations.

Roadways

Congestion

Under existing conditions, traffic congestion within the Town of Elizabeth is mainly limited to CO 86 during the weekday peak hour or immediately before or after special events. The signalized intersections of CR 13 and Elizabeth St are also a point of recurring congestion that will be resolved with completion of the planned project to realign CR 13. By installing a new traffic signal, turn lanes, and improved pedestrian crossings the realignment project will resolve the current congestion issue at that location.

Otherwise, traffic congestion within the Town typically occurs at the unsignalized intersections along CO 86 during peak hours. Vehicular traffic either crossing or turning left onto CO 86 at these locations, as well as pedestrian and bicycle crossing movements experience some delays. Outside of peak traffic periods even the unsignalized intersections with CO 86 operate acceptably.

Maintenance

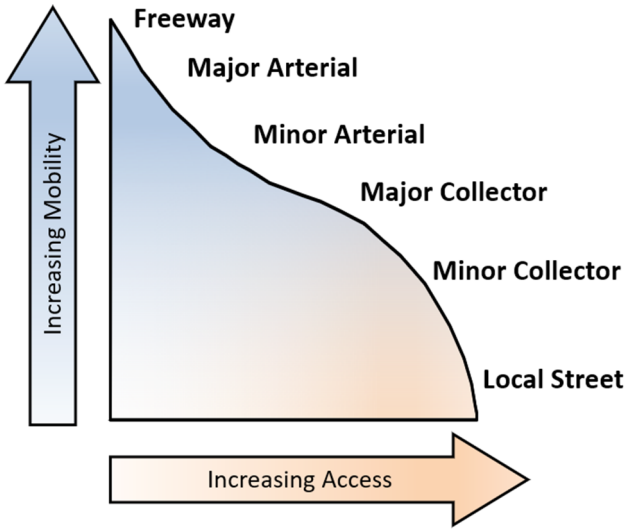
The Town of Elizabeth currently maintains nearly 16 miles of public streets, not including State Highways or private roads within the Town. A street is made up of many different elements - the surface (concrete, asphalt, gravel, etc.), curb/gutter, shoulders, subgrade, drainage (culverts, subdrains), striping, signage, lighting, and signals. Future traffic counts, percentage of trucks, and roadway classification are used to determine the type and design of roadway pavements. Roads are typically designed to accommodate 20 to 30 years' worth of traffic before complete reconstruction would be necessary.

It is more cost-effective to apply less expensive treatments early in the pavement's life cycle rather than allowing the pavement to deteriorate to the point of reconstruction and significant cost. During the first stage of the pavement life cycle, a road can be restored to nearly new condition with the application of relatively inexpensive crack seal and chip sealing the surface or with thin overlays. During the second and third stages the pavement has lost some structural strength, especially where water intrudes at cracks,

softening the foundation soils and increasing freeze-thaw deterioration of the asphalt itself, requiring patching. If allowed to deteriorate further, the pavement has lost so much structural integrity that it usually needs to be reconstructed. The goal is to use low cost, but socially acceptable maintenance techniques at the appropriate time to keep pavement on the "high end" of the curve to minimize long term costs.

Roadway Functional Classification

In order to preserve the functional integrity, safety, and capacity of roadways in the Town, it is necessary to manage access to the transportation system. Each classification of roadway represents a compromise between the level of mobility (use by through traffic) and access (driveways). A proliferation of driveways and residential street intersections decreases the speed and capacity of major roadways while increasing hazards to motorists. A hierarchical roadway classification system encourages, to the maximum extent possible, the provision of direct access to the roadways with lower functional classifications and to a limited degree, the minor arterial network. For major arterials, the priority function is mobility, which means that the access to these roads (either interchanges or at-grade signalized intersections) should be limited.



Safety

With increasing traffic and population growth, maintaining safety for travelers is a top priority of the Town. Crash data was collected over the five-year period from July 1, 2013 to June 30, 2018. Within and near the Town Limits, including CO-86 and portions of Elbert County, 325 crashes were reported during this time. Of these, there was one fatal crash resulting in two deaths and 75 crashes resulting in injury. Table 1 summarizes the crash totals within Town limits.

Table 1: 5 Year Crash History (Town of Elizabeth)

Location	Property Damage Only	Injury	Fatal	*Total*
CO 86	54	14	0	*68*
Rest of Town	195	61	1	*257*
Total	*249*	*75*	*1*	*325*

Crashes involving fixed objects (e.g. fence, sign, tree, embankment) were the most common and represented 36 percent of all crashes. Eighteen percent of the crashes were rear-end collisions. Approximately 10% of the reported crashes involved a vehicle striking an animal. There was only one reported crash involving a pedestrian in the five years of data.

Multi-Modal Travel

The Town has plans for the implementation of transportation services and facilities for a range of travel modes. The term multi-modal refers to the establishment of services and facilities for not only automobile, but also bicycle, pedestrian, freight and transit. In order to provide a balanced system, transportation planning must accommodate all of these modes. Moving forward the Town is working towards the preservation of right-of-way where necessary to support all travel modes and help ensure the mobility and quality of life for Town residents.

Pedestrian/Bicycle

Sidewalks and shared use trails generally serve the purpose of providing pedestrian and bicycle access between neighborhoods, to commercial areas, and for recreational purposes. Additionally, some trails are accommodating to equestrian usage.

Currently, sidewalks have been implemented along many of the streets within Town. Bicycle facilities are limited but many of the streets readily accommodate bicycles due to lower travel speeds and moderate traffic volumes. The Town has roadway standards that include provisions for bicycle lanes and as development occurs and streets are improved more opportunities to implement bicycle facilities are expected.

There is a need for improved and continuous pedestrian and bicycle facilities in the Town. These facilities should be well maintained, properly lit at intersections, and accessible to all people regardless of factors such as age and ability. Trails that are not adjacent to roadways should also provide access to emergency services when possible. There is also a need for safety improvements at designated crossings of CO 86.

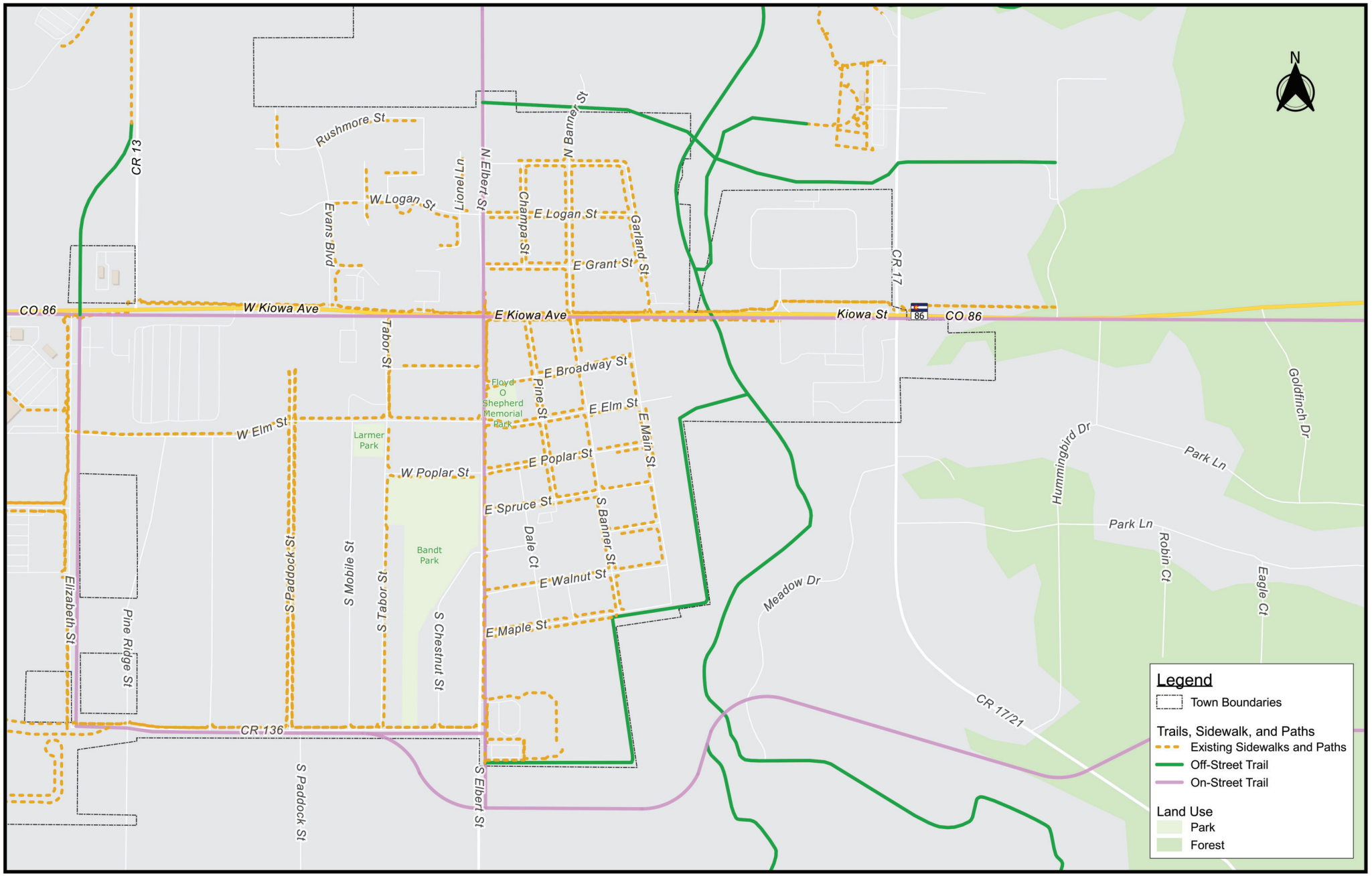


Figure 1: Existing and Potential Sidewalk and Trails (Old Town Area)

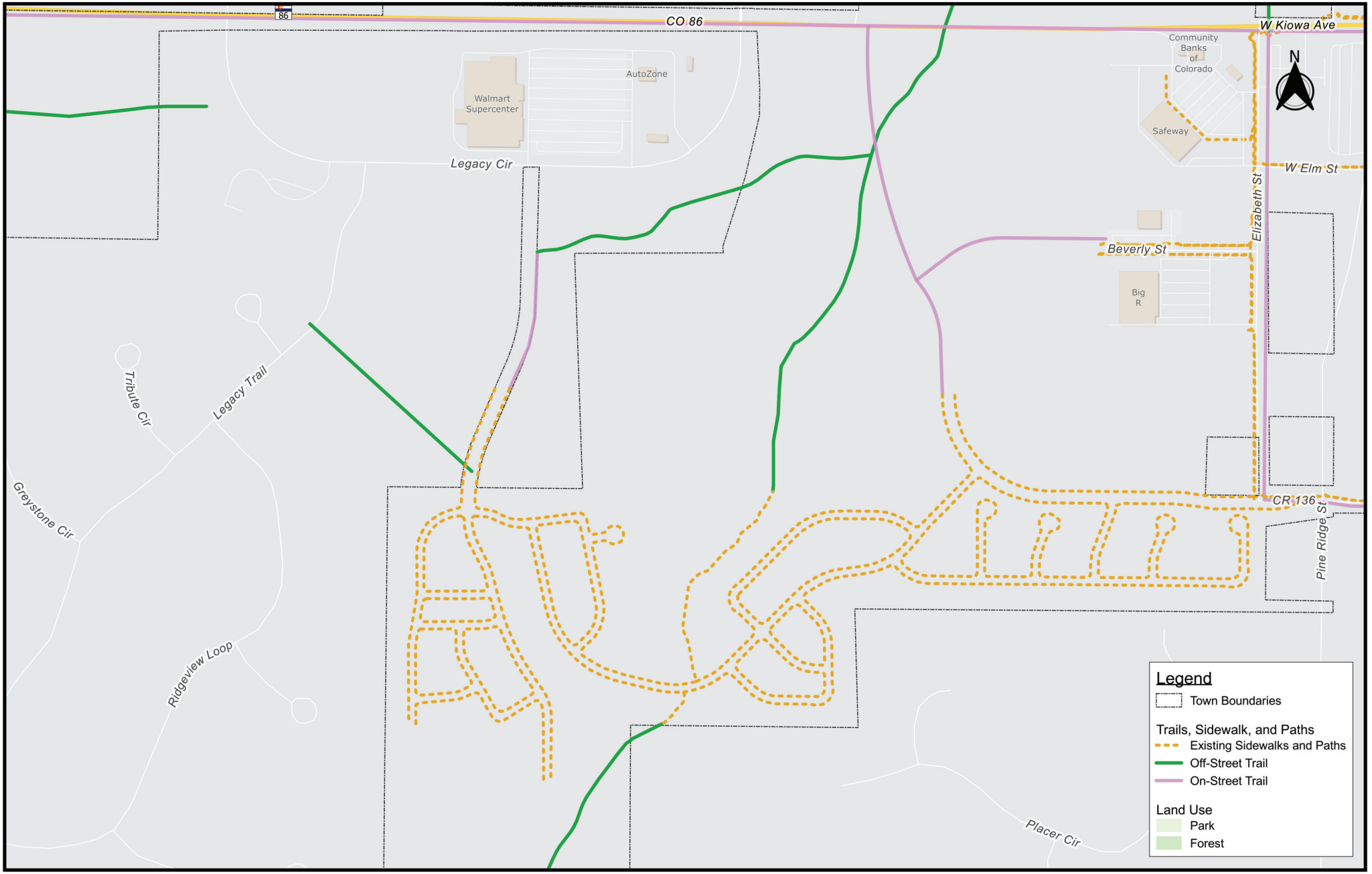


Figure 2: Existing and Potential Sidewalk and Trails (western Elizabeth)

Transit

The East Central Council of Governments (ECCOG) sponsors a fared rural transit service called The Outback Express that offers rides to older adults, persons with disabilities, and the general public in Cheyenne, Elbert, Kit Carson, and Lincoln counties. This is a scheduled demand responsive system, servicing the Town of Elizabeth approximately three times per week.

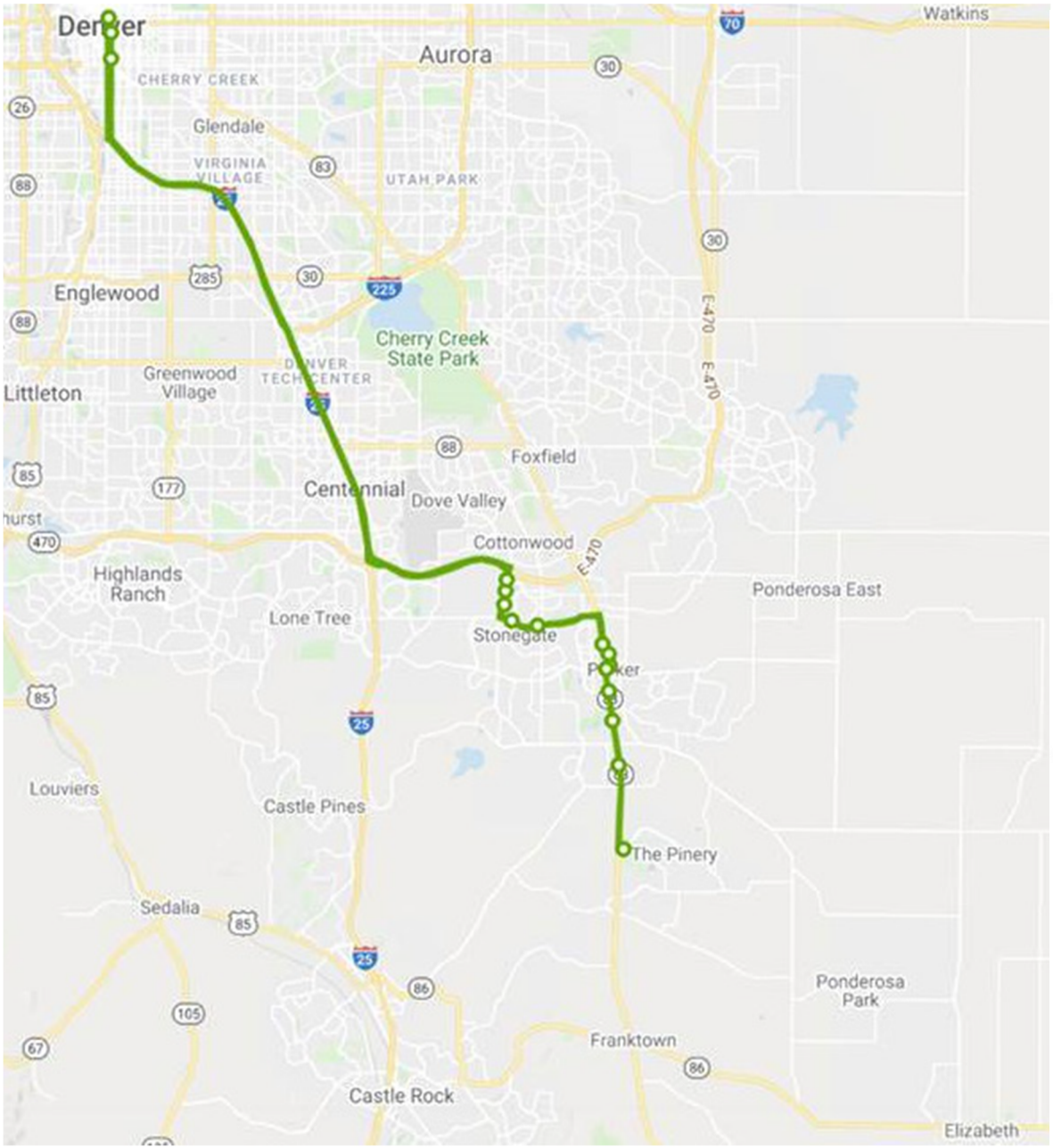
Since the Town of Elizabeth is outside of the Regional Transportation District, there is no other transit service in the Town. The nearest RTD service is located at The Pinery off of Parker Rd (CO 83). This is a regional bus service that is limited to morning and afternoon peak hours.

CDOT's Bustang also offers service along I-25 between Colorado Springs and the Denver Tech Center. The service is direct from Monument to the Arapahoe Park-n-Ride. There is not currently a stop at I-25 and CO 86 to accommodate trips between the Denver metropolitan area and the Town of Elizabeth.

As the Town's population increases, mobility for elderly and disabled persons will become a more pressing need. Establishment of more in-patient medical facilities and senior housing developments within Town may provide opportunities for some of this mobility need to be addressed through privately operated shuttle services. This type of transit service will largely be market driven and provided as an amenity to private development.

Ride-hailing Services

Ride-hailing services such as Uber and Lyft can help address unmet personal mobility needs in several ways. For example, these services can help close the gap between regional transit and the Town, provide a mobility option for the elderly and disabled, or help to get locally from place to place when a personal vehicle is otherwise unavailable. The Town of Elizabeth is not consistently served by ride-hailing services. Until the demand for such services reaches a point that is economically feasible for drivers, this inconsistency in ride-hailing services availability will continue.



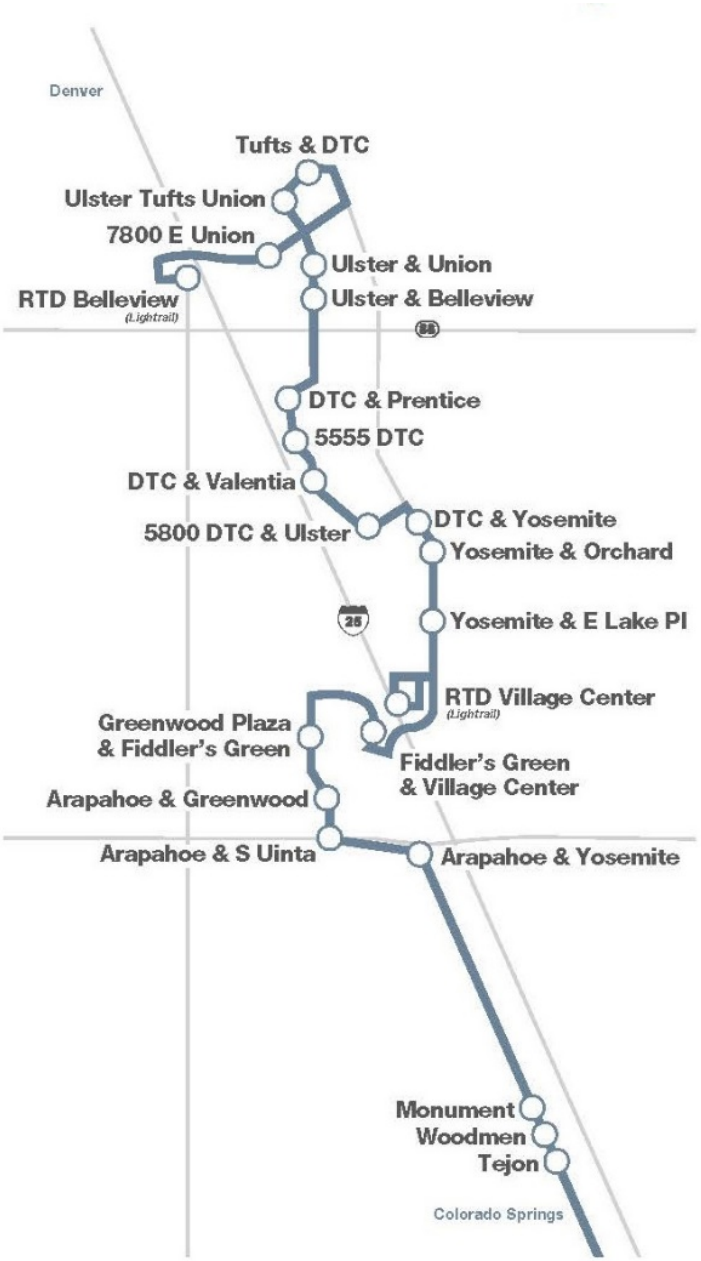


Figure 3: RTD (left) and Bustang (right) service

Freight

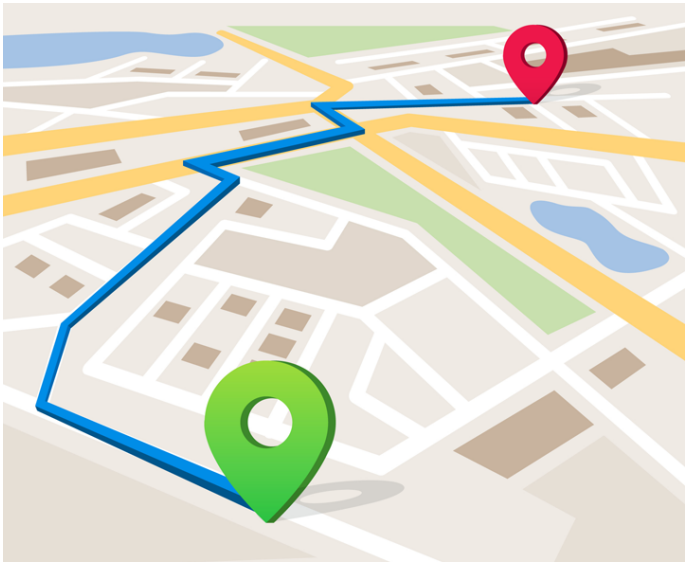
Although truck traffic makes up only a small fraction of the total traffic on the average roadway, it is often the most destructive to pavement, the noisiest, and requires special consideration due to size, weight, and long stopping distances. We rely on trucks to deliver the goods we live on, so not allowing trucks to use town streets is unreasonable. The goal is to limit trucks to several strategic routes through and around town. Truck traffic typically accounts for less than 3% of all traffic on Town of Elizabeth streets. Truck traffic is heaviest on CO 86 through town with approximately 350 trucks per day.

The 2040 Transportation Plan

As the Town of Elizabeth and the surrounding area continues to grow and evolve, the demands placed on the transportation network will increase. The ability of the transportation network to handle increased demand and provide safe and efficient mobility for all modes of travel, including both motorized and non-motorized modes, will influence the quality of life of residents and people visiting Elizabeth.

Vehicles

Most residents in and near the Town of Elizabeth are primarily using vehicles to get from one place to another. The following sections discuss alternative fuel vehicles, where people are going, how they are getting there, and what vehicular traffic may look like both now and in the future.



Alternative Fuel Vehicles

Although most vehicles on the road at this time are gasoline or diesel-powered, as these vehicles are being replaced over time some are choosing gas-electric hybrids, plug-in hybrids, or electric vehicles (EV). This trend is anticipated to continue, particularly as automakers expand their lineup of alternative fuel vehicles. One way for the Town to support use of alternative fuel vehicles is to encourage new developments to provide EV charging stations as appropriate. The Town may also consider deployment of EV charging stations in civic gathering places such as Main Street.

Where are people going?

An important step in analyzing the needs of a transportation network is to first understand the vehicular travel patterns in the area. For communities like the Town of Elizabeth, where commuting outside of the Town for work and other services is common, Journey to Work data published by the US Census Bureau can be a valuable tool.

Figure 4 on the next page graphically illustrates the Journey to Work information for those living within the Town of Elizabeth 3-mile planning boundary.

Key Takeaways:

- The Denver metro area is the primary destination
- Over 80% of destinations are to the north or west of the Town.
- Very few trips (approximately 5%) are internal to the Town of Elizabeth 3-mile planning boundary.

How are people getting to their destinations?

To get to their destinations, vehicular travelers must use the existing roadway network (unfortunately flying vehicles were not yet widely used as of the time of this publication).

The Journey to Work information was further analyzed by assessing the fastest route each vehicle from within the Town of Elizabeth 3-mile planning boundary would ideally take to arrive at their destination. Figure 5 is a graphical representation of this analysis. Routes vary from a light yellow color indicating fewer vehicles, to a dark green color indicating many vehicles.

Key Takeaways:

- Important existing roadway connections include: CO 86, CO 83, Singing Hills Rd, Delbert Rd, Hilltop Rd, Flintwood Rd, Russellville Rd, CR 13, CR 21

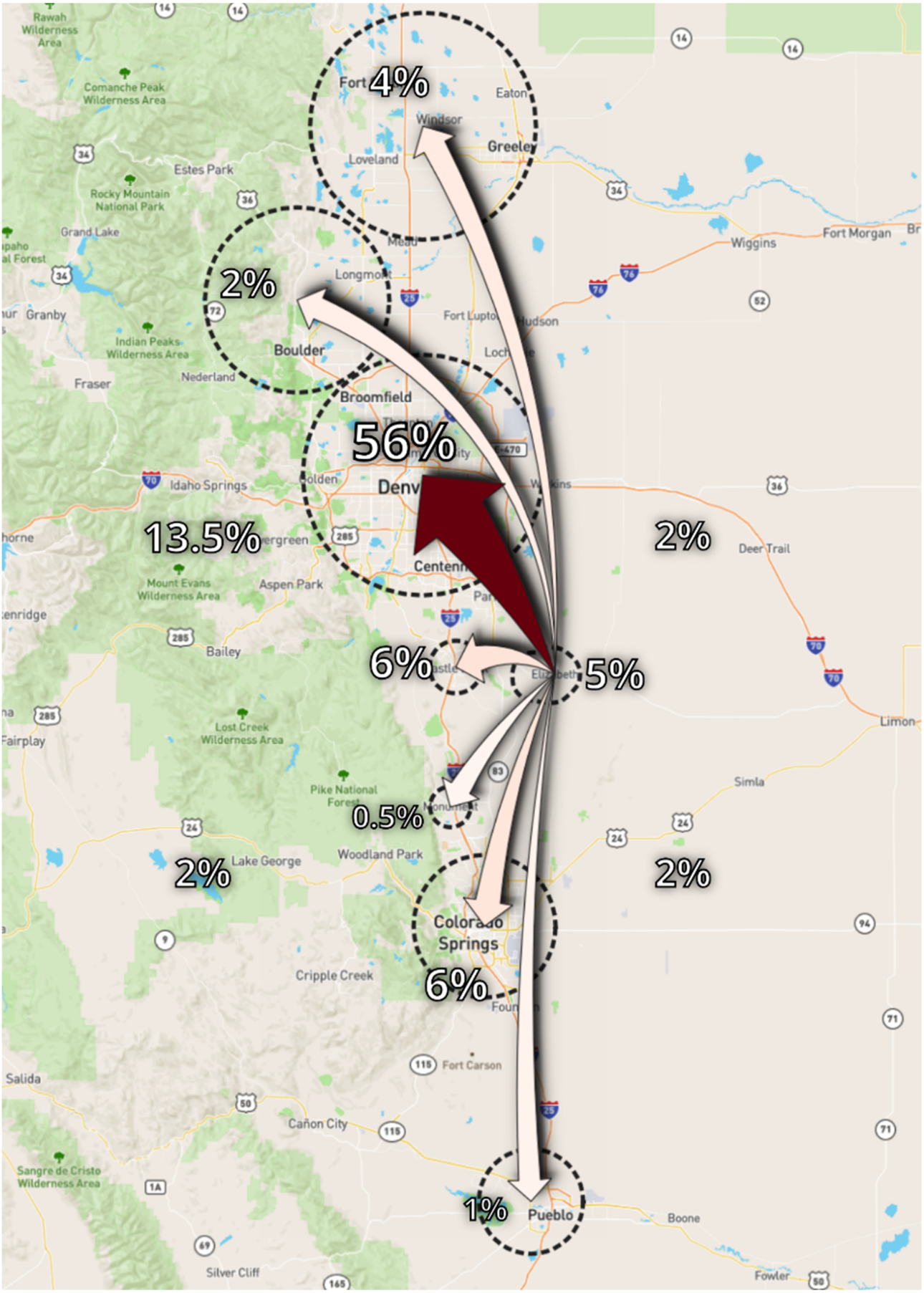


Figure 4: Employment destinations of Town residents

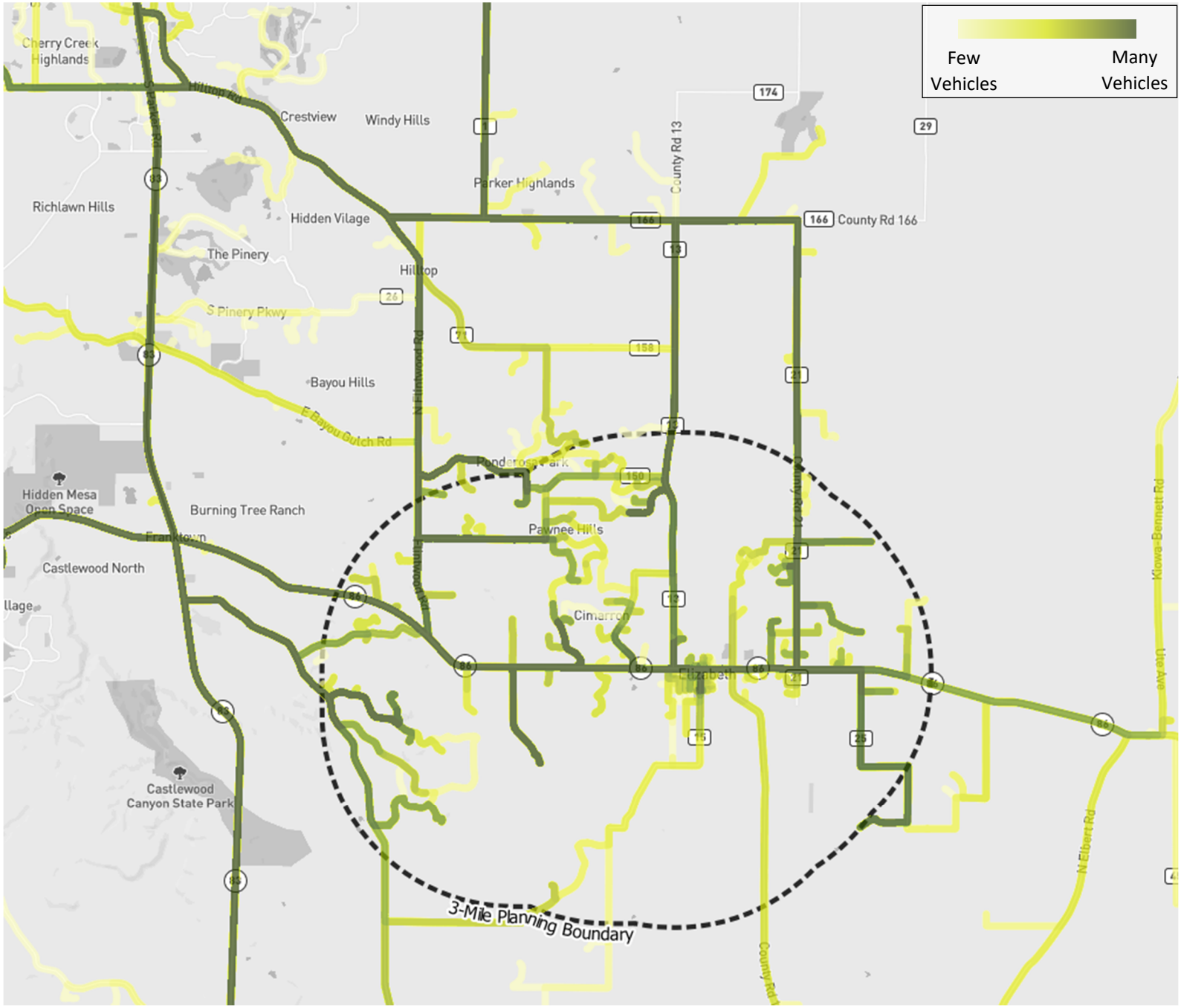


Figure 5: Common routes used by Town residents

What do traffic conditions look like currently?

So far, Journey to Work information has provided valuable qualitative information of the travel patterns near the Town of Elizabeth 3-mile planning boundary. This information was then used to calculate average daily traffic (ADT) volumes on major roads in the same area. More details on these calculations can be found in the appendix.

Level of Service

Level of Service (LOS) is a frequently used metric to grade the quality of traffic flow on a roadway. Levels of Service range from the highest grade of A, where traffic is free flowing and vehicles can expect to travel at the posted speed limit, down to a grade of F, where the roadway is heavily congested, traffic flow is highly unstable, and vehicle speeds are greatly impeded. Figure 6 is a visual representation of what varying Levels of Service may look like for a two and four lane highway. It is common practice to design roadways to operate at LOS D or better.

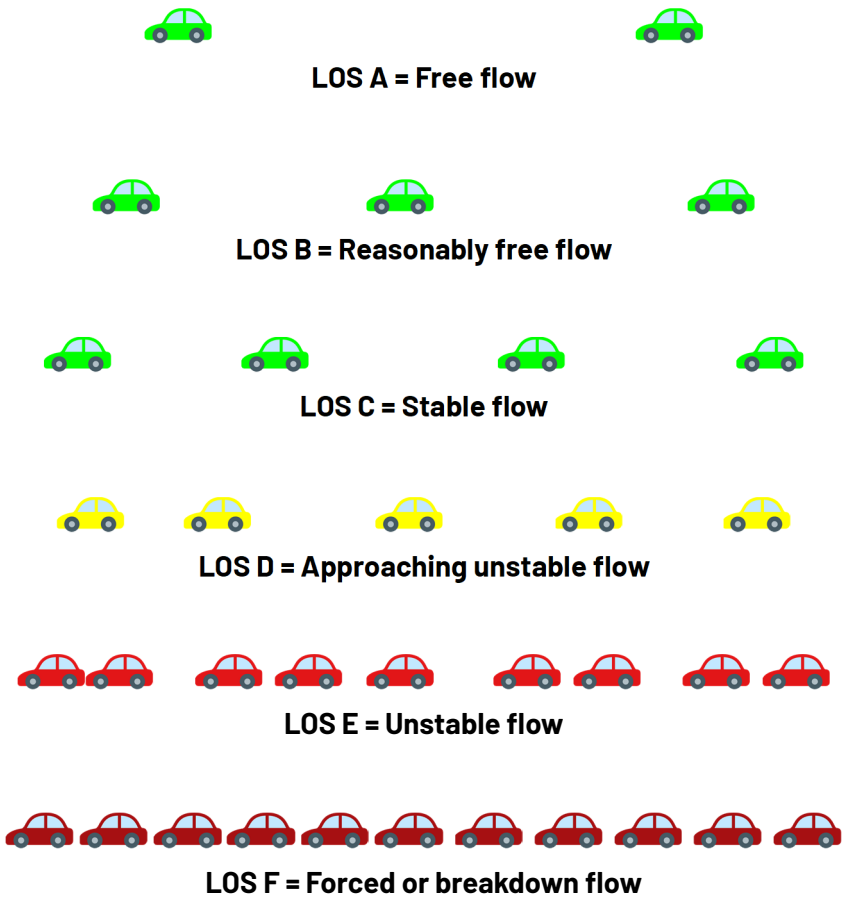


Figure 6: Level of Service

All LOS grades in this plan have been determined using Table 2 which associates the calculated ADT volume to levels of service for the types of roadways near the planning area.

Table 2: Level of Service

Area Type	Terrain	Roadway Type	Through Lanes in Each Direction	ADT (2-way vehicles per day)			
				LOS C or Better	LOS D	LOS E	LOS F
Rural	Rolling	Two-Lane Highway	One	≤5,600	>5,600 and ≤11,500	>11,500 and ≤24,100	>24,100
Rural	Rolling	Multilane Highway	Two	≤36,800	>36,800 and ≤45,600	>45,600 and ≤52,000	>52,000

Figure 7 on the next page illustrates the current levels of service and ADT volumes near the Town of Elizabeth planning area.

Key Takeaways:

- The current roadway network is highly dependent on CO 86 and lacks other east-west and north-south roadway connections.
- CO 86 currently may experience some traffic congestion during peak times.
- Singing Hills Rd (CR 166) may experience some traffic congestion during peak times or special events, but typically operates an acceptable Level of Service.
- All other roadways experience little to no traffic congestion.

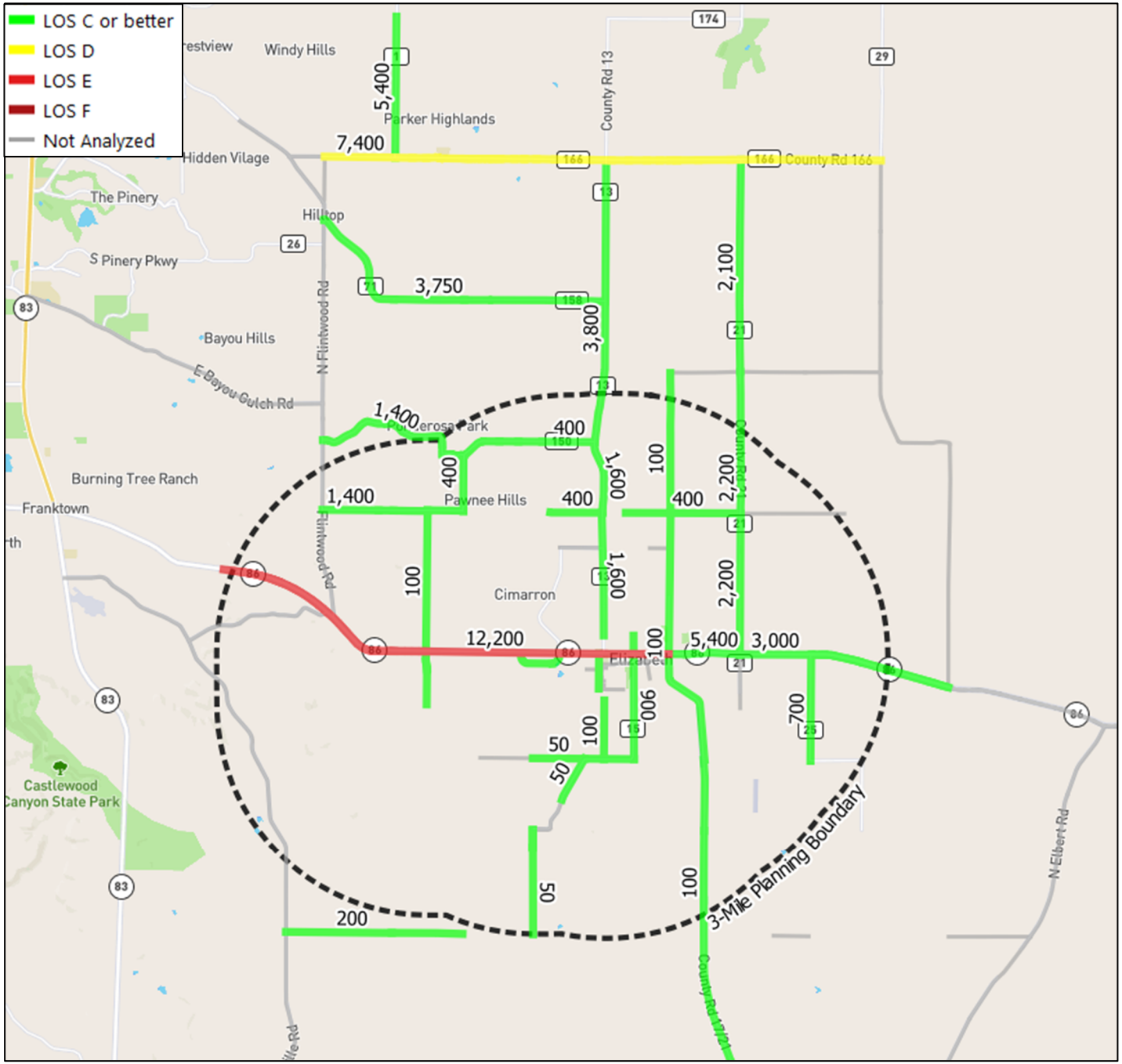


Figure 7: Existing Traffic Conditions

Future Conditions and Improvements

The Existing Planning Efforts section identified several locations where the roadway network near the Town of Elizabeth could be improved. This plan echoes many of those improvements while also suggesting new key roadway connections and modifications. The overall goal of the roadway network is to safely and efficiently accommodate traffic both now and with an eye on what future conditions may look like. The roadway network should also be resilient, such that access to and from the Town of Elizabeth is not solely dependent on CO 86.

With this in mind, Figure 8 depicts the vision of this roadway network. Figure 8 also shows what traffic volumes and congestion may look like in the future. These future conditions consider that the majority of residents will follow similar Journey to Work travel patterns as they do now, which is consistent with details in the recent Town of Elizabeth Comprehensive Plan. The roadway network in Figure 8 includes several key improvements and new roadway connections such as:

- Additional lane in each direction:
  - CO 86 west of CR 21
  - CR 13 north of CO 86
  - Singing Hills Rd west of CR 21
  - Hilltop Rd west of CR 13
- New connections:
  - Delbert Rd from CR 122 north to Singing Hills Rd
  - CR 17 north of CR 154
  - Extension of CR 9/15 west to Douglas County
  - CR 132 from CR 13 east to CR 25
  - CR 15 from CR 122 north to CR 132
  - CR 9 north from CR 9/15 to Legacy Cir
  - CR 122 continuous from CR 5 east to Elbert Rd
  - Other minor roadway connections

Key Takeaways:

- New roadway connections will help reduce the reliance on CO 86.
- Downtown Elizabeth, approximately from CR 13 to CR 17, may experience some traffic congestion during peak hours of travel.

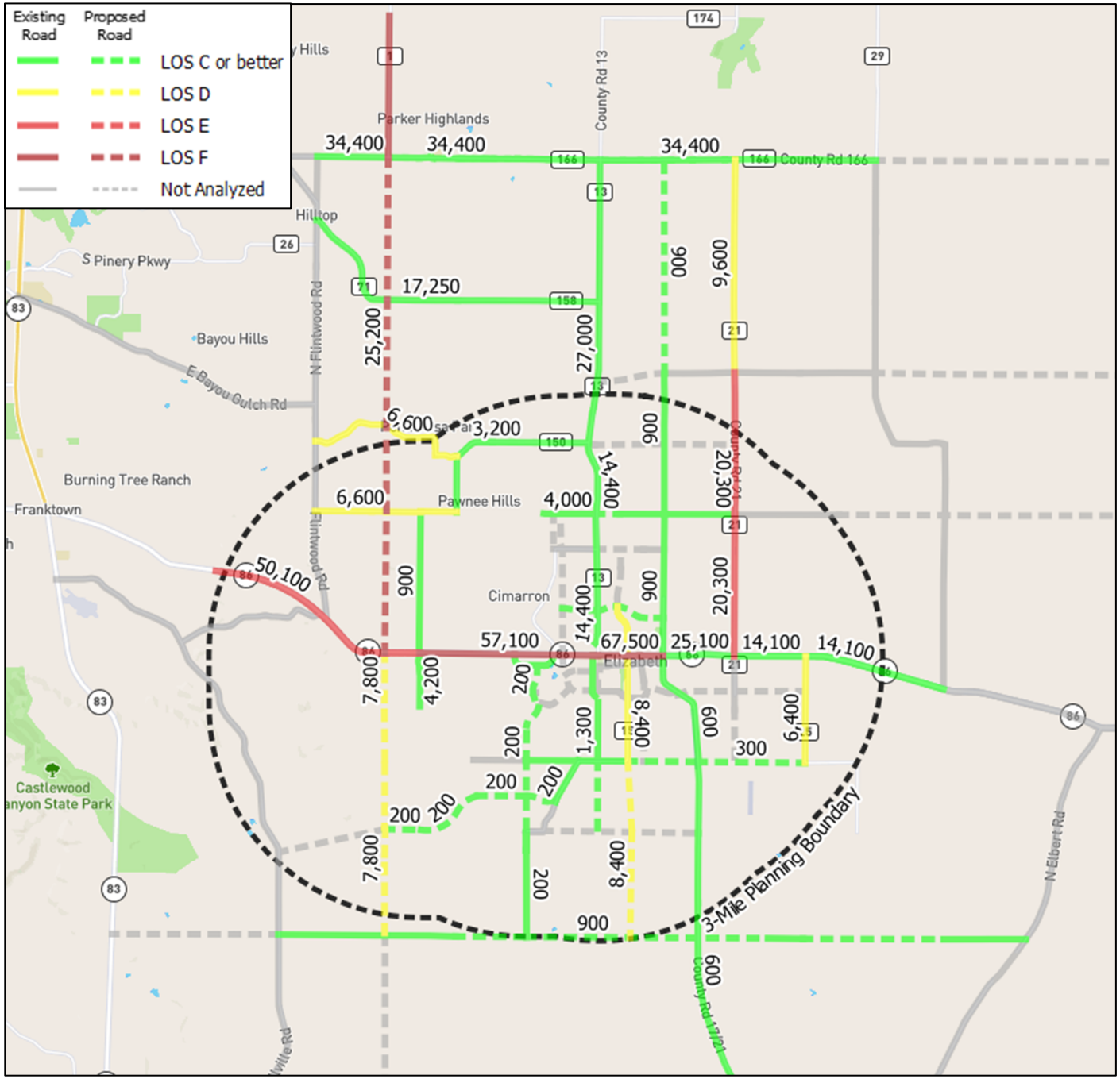
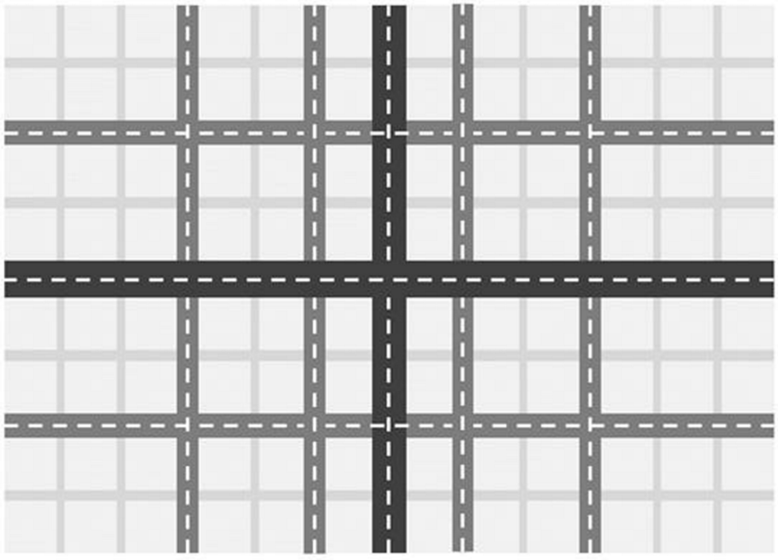


Figure 8: Future (2040) Traffic Conditions

Functional Classifications

Functionally classifying roadways allows a transportation network to align in a strategic manner, such that roadways can be designed with varying degrees of priorities in mind.

Specifically, four functional classifications have been developed for the Town of Elizabeth: arterial, major collector, minor collector, and local road. Each roadway near the planning area has been assigned a functional classification based upon its current function and use, consistency with other regional planning efforts, and its traffic volume. Figure 9 and Figure 10 on the next pages show this information.



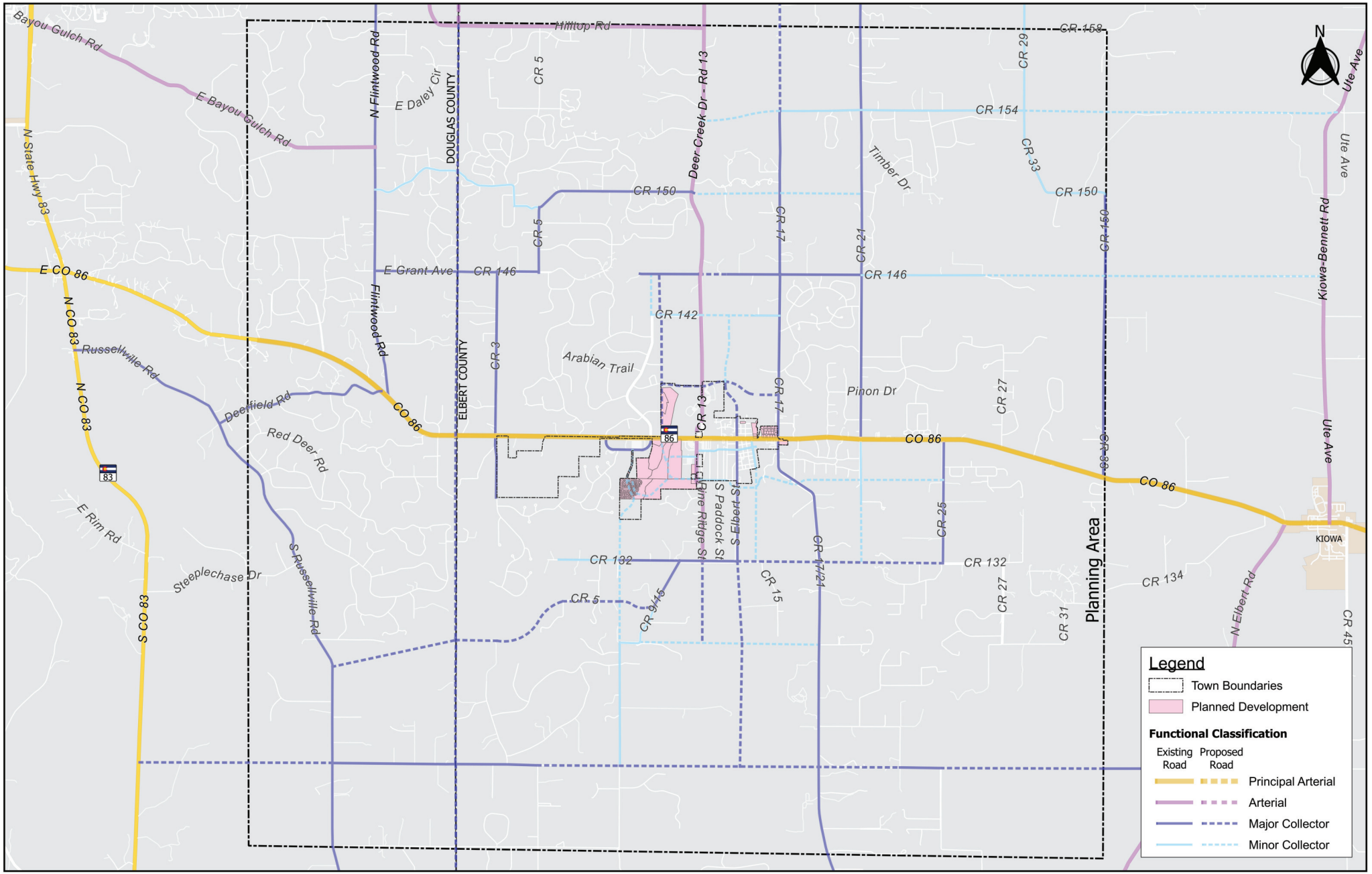


Figure 9: Proposed Functional Classification (Regional View)

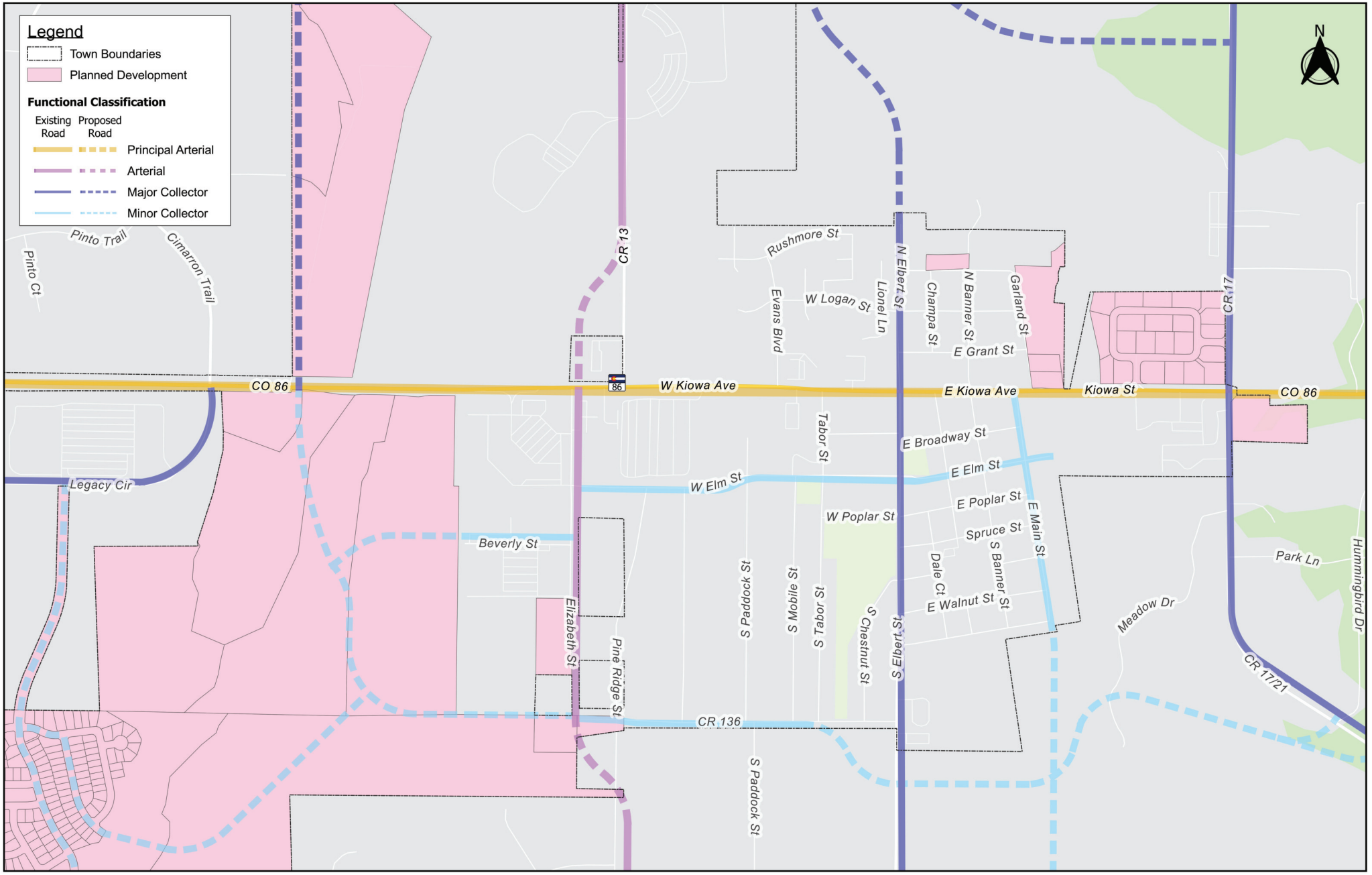


Figure 10: Proposed Functional Classification (Local View)

Illustrative typical roadway cross sections seen in Figure 11 on the next page have also been developed for the various functional classifications. These typical sections can be viewed as what the roadway would ideally look like. It is not practical to immediately make all roadways conform to these typical cross sections. Rather, these cross sections can be used to guide potential right of way acquisition should a particular area redevelop, keeping the ultimate vision for the roadway in mind. If new roadways are constructed, as discussed in later sections of this plan, it is advisable to construct these new roadways according to their need, balancing current or projected need with the ultimate vision again in mind. More detailed roadway cross sections can be found in the Town of Elizabeth roadway design standards.

As mentioned in the Introduction and Intent, a transportation plan identifies the existing and potential locations, alignments, and types of current and proposed roadways and trails and provides the Town with a mechanism for pursuing and preserving land for these proposed alignments. A transportation plan does not perform detailed engineering studies, such as would be required to determine whether a roundabout or traffic signal is a more appropriate treatment at an intersection. Those types of determinations are made much closer to implementation as part of the engineering design process.

Key Takeaways:

- Roadway functional classifications and typical sections should be used to guide necessary roadway improvements in the event of redevelopment, reconstruction, and/or new construction.
- Specific design treatments are determined at the time of design based upon engineering analyses.

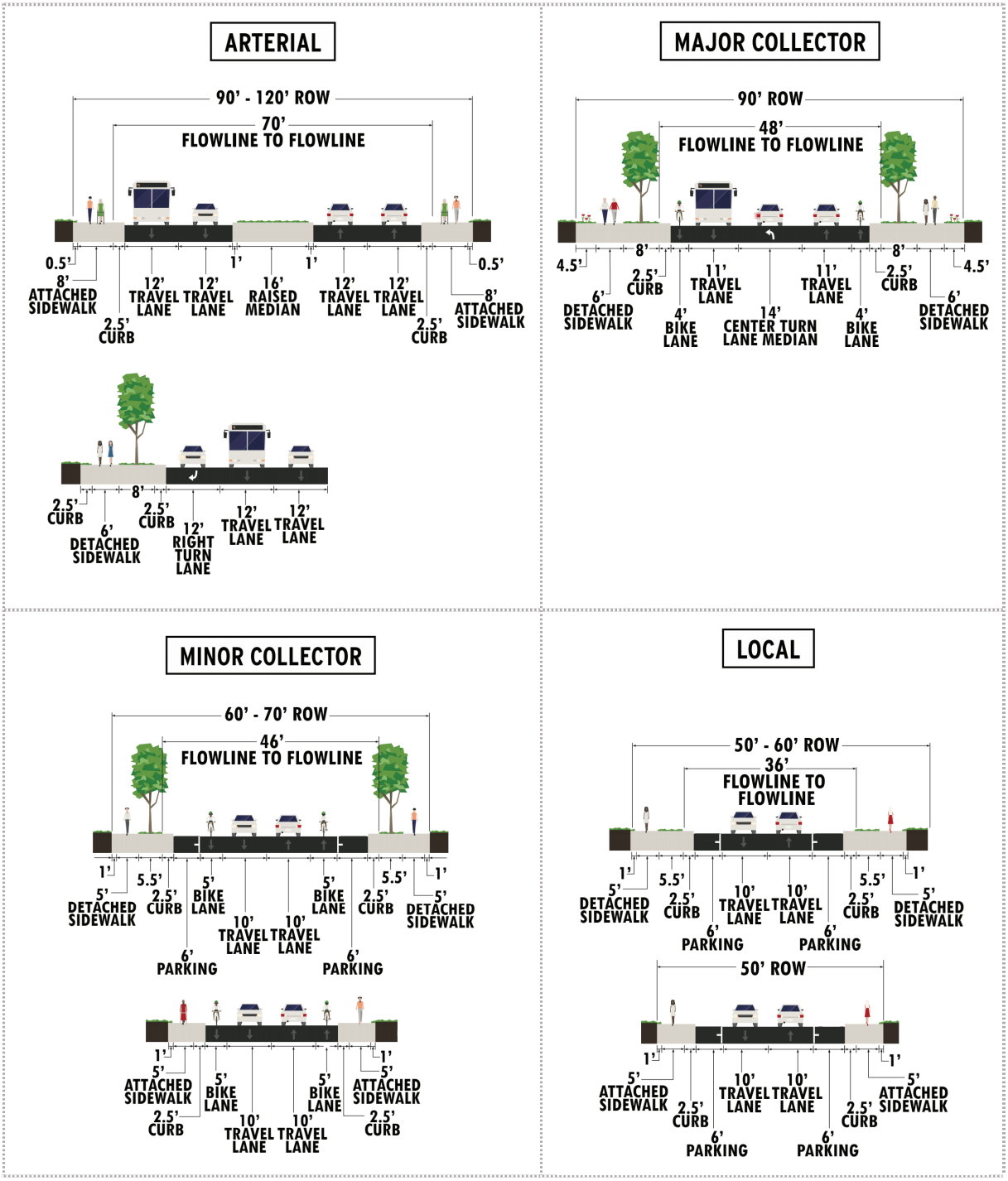


Figure 11: Illustrative Typical Cross Sections

Note: These typical cross sections are meant to be used for planning and illustrative purposes only. Consult the Town Street Standards and Specifications for further details.

CO 86

The CO 83 / CO 86 Access Control Plan (2006) and Figure 12 on the next page depict locations of current, potential, and approved (when warranted) traffic signals on CO 86. CDOT is ultimately responsible for all traffic signal installation and maintenance on CO 86. CDOT closely follows the prescribed guidelines from the Manual on Uniform Traffic Control Devices (MUTCD) which evaluate nine criteria in determining when a traffic signal may be warranted. The Town of Elizabeth should continue to partner with CDOT to continuously evaluate the traffic control needs along this state highway.

Figure 8 shows that future traffic volumes on CO 86 are forecast to increase such that an additional lane in each direction will be needed to alleviate future traffic congestion. Further, it is recognized that more detailed study on of CO 86 is needed to identify a comprehensive future vision for the corridor that addresses the long-term mobility needs of the Town, western Elbert County, and the larger region. In the meantime, incremental improvements such as turn lanes and pedestrian and bicycle facilities along CO 86 should be funded and constructed by adjacent developments as required to address the mobility impacts of the developments. These incremental improvements provide the starting point for long-term improvement of CO 86 in accordance with the vision.

Key Takeaways:

- Traffic signals on CO 86 could be installed at various locations near the Town of Elizabeth when they are warranted.
- A thoroughly detailed corridor study specific to CO 86 will help provide a long-term vision for the highway that addresses the current and future mobility needs of the Town and the surrounding region.

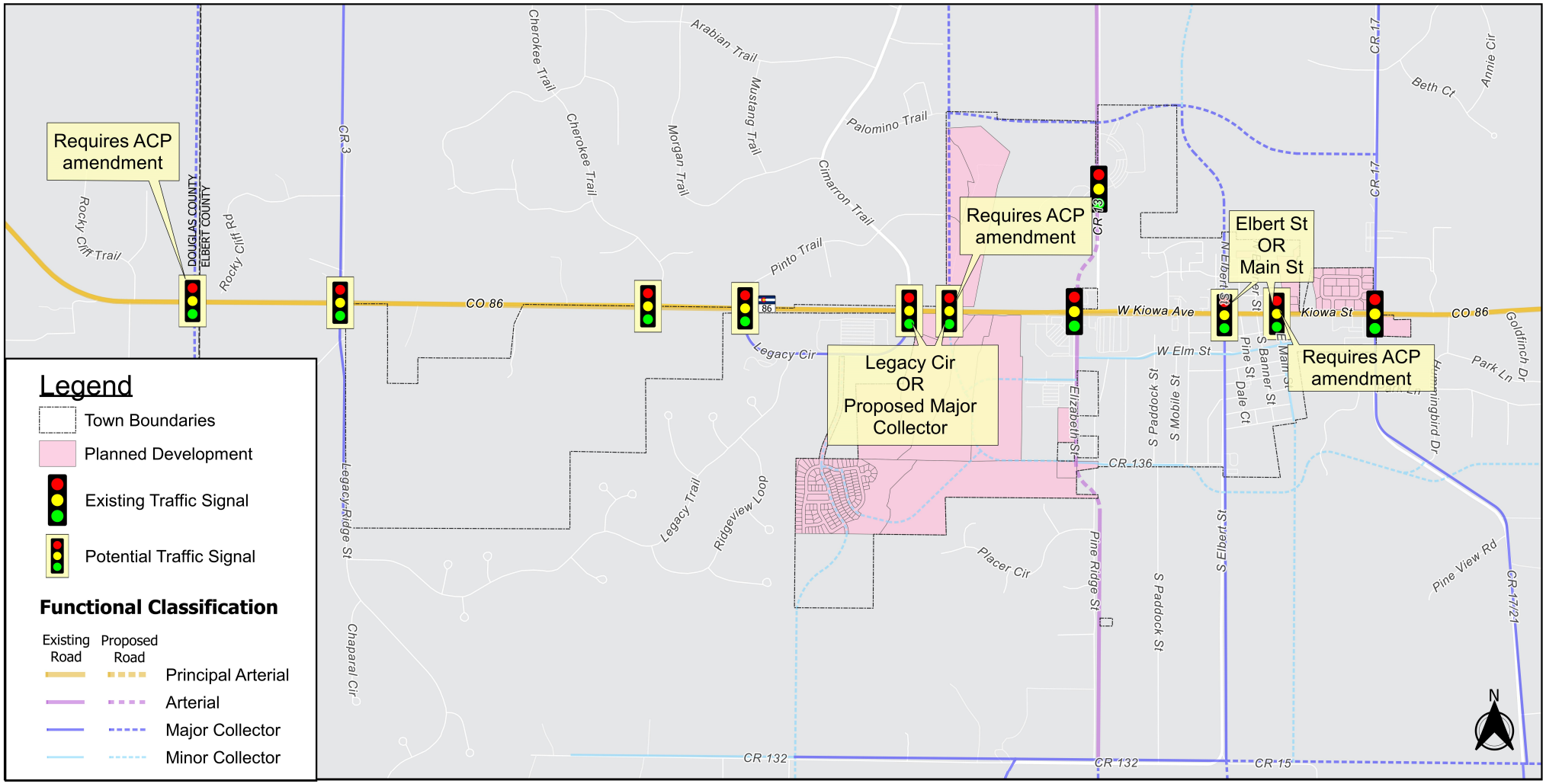


Figure 12: CO 86 Traffic Control

Nonvehicular Travel

Bicycles and Pedestrians

Much like how Journey to Work information was used to figure out where people are currently traveling by vehicle, Strava Heatmap data was used to figure out where bicycle and pedestrians are currently traveling. Many people use Strava to track their walks, runs, bicycle rides, etc. Strava then summarizes this data from all users and produces a heatmap. Roadways and paths shown in Figure 13 on the next page are colored ranging from blue (cold) to red (hot) lines indicating very little to a lot of bicycle and pedestrian activity.

Concurrently, the Town of Elizabeth Comprehensive Plan (2019) developed a parks, recreation, open space, and trails plan. This plan is highly valuable as existing or planned trails tend to overlap with the Strava Heatmap data. Figure 14 is a new recommended trails plan which combines this information in one inclusive map. The new trails plan continues to preserve the Gold Creek, Running Creek, and Dry Creek corridors as valuable potential trail locations which can help provide regional connectivity. Figure 14 also indicates whether the planned trail should be located on or off street, which can be tied back to the various roadway cross sections previously discussed. These facilities should be well maintained, properly lit at intersections, and accessible to all people regardless of factors such as age and ability. Trails that are not adjacent to roadways should also provide access to emergency services when possible.

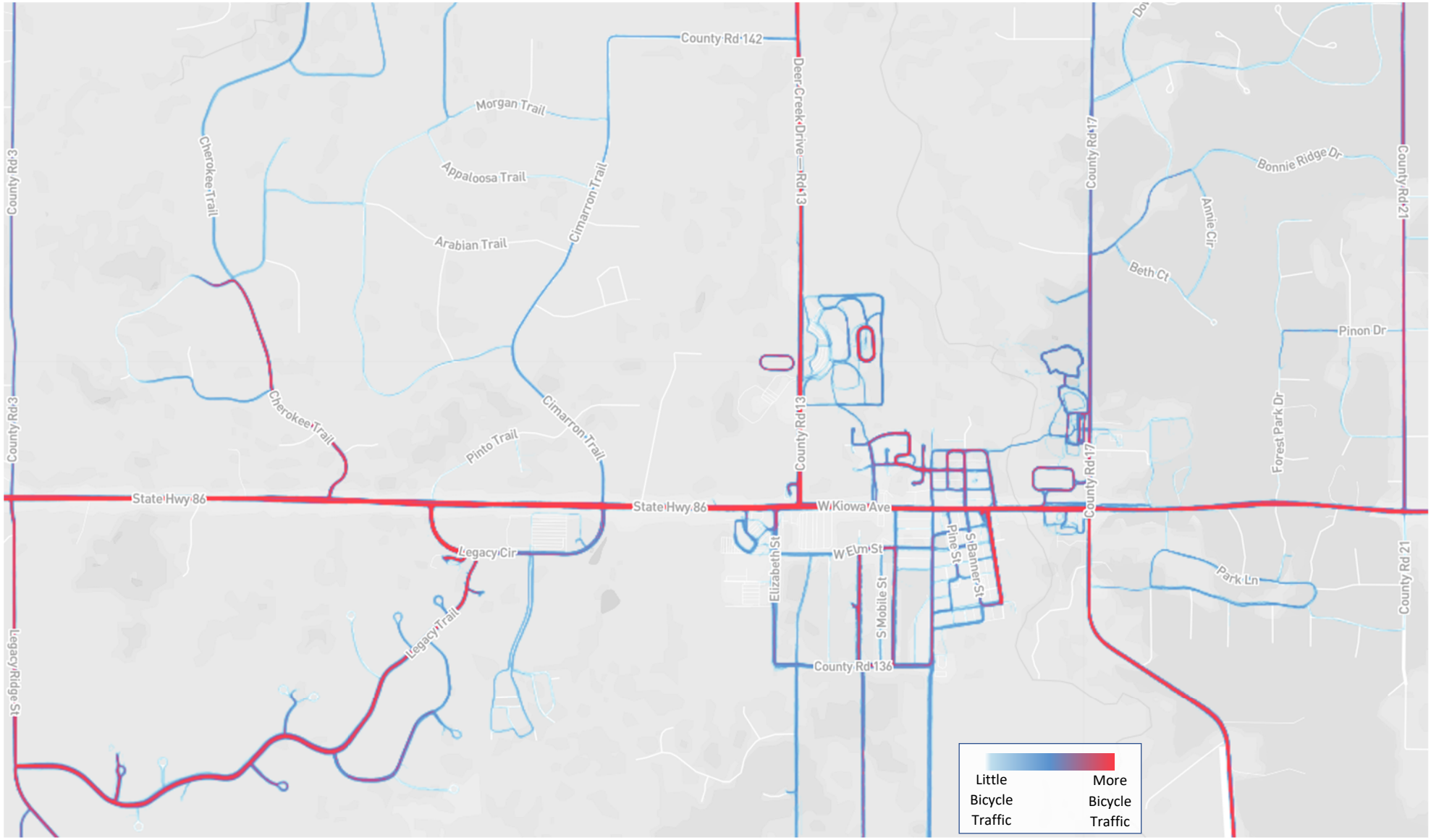


Figure 13: Strava Heatmap

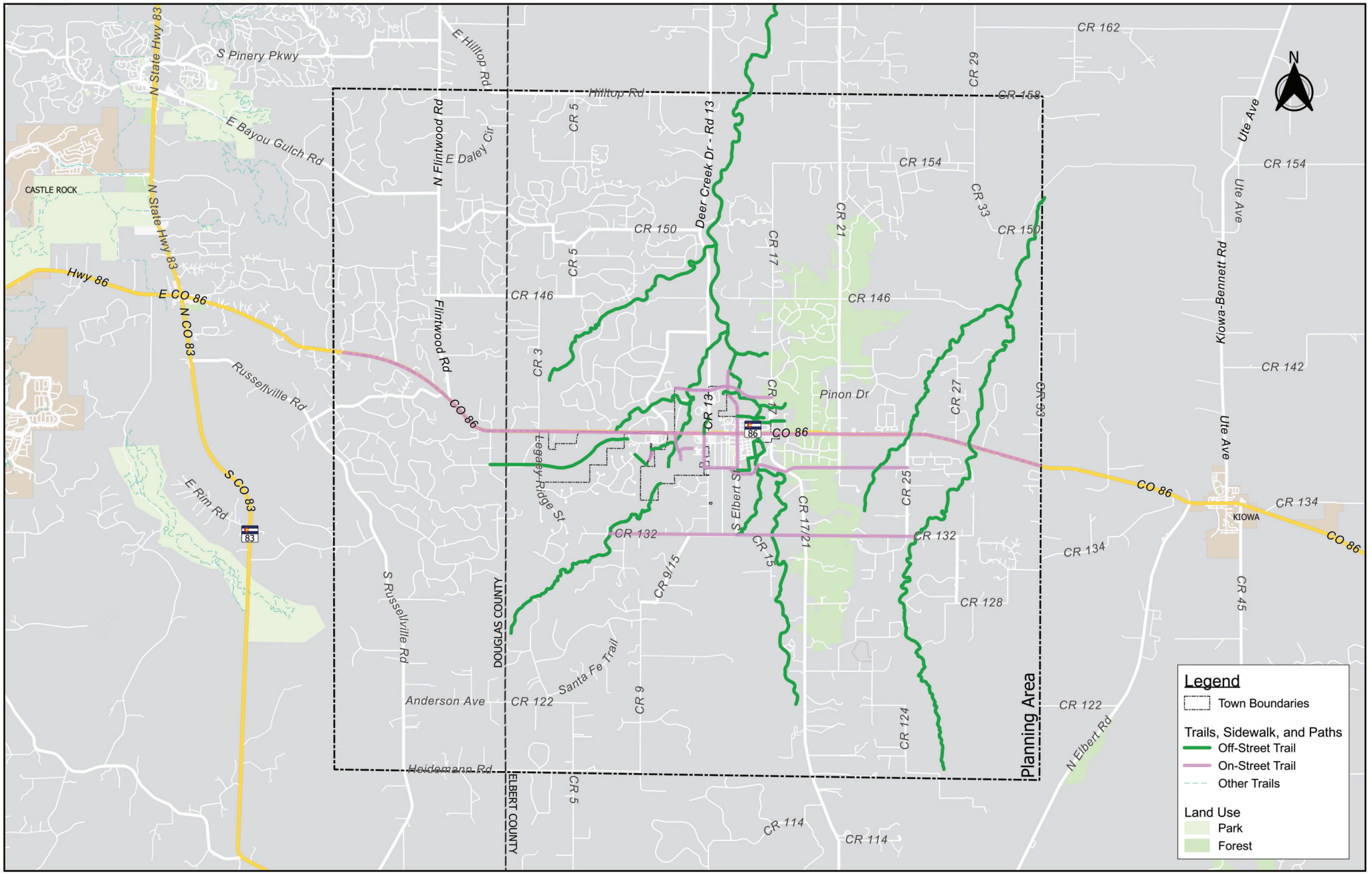


Figure 14: Existing and Potential Sidewalk and Trails

Equestrian

As part of the public input process during the development of this plan, Town of Elizabeth and Elbert County residents expressed the desire for more equestrian trails. At this time, it is not known specifically where current equestrian activity is highest. However, the previously shown new trails and paths plan could also accommodate equestrian activity if needed. When trail reconstruction or new construction occurs, an analysis of equestrian activity in the nearby area could guide if the trail should be wider, paved, or otherwise more or less accommodating to equestrian travel.

Key Takeaways:

- Creek corridors can provide valuable regional trail connectivity.
- Existing and proposed paths and sidewalks in the Town of Elizabeth will help safely and efficiently allow for multi-modal travel.
- Local input received during the development of this plan expressed interest in improving equestrian trails and amenities in the Town and Elizabeth and surrounding areas.

Summary

Various key takeaways have arisen throughout this plan. In general, these takeaways can be summarized as follows:

- A significant amount of population growth is expected in and around the Town of Elizabeth.
- Missing or insufficient roadway and trail connections exist in the Town of Elizabeth and Elbert County. These missing or insufficient connections increase travel time and limit travel options for commuters.
- Important existing roadway connections include: CO 86, CO 83, Singing Hills Rd, Delbert Rd, Hilltop Rd, Flintwood Rd, Russellville Rd, CR 13, CR 21
- The current roadway network is highly dependent on CO 86 and lacks other east-west and north-south roadway connections.
- CO 86 currently may experience some traffic congestion during peak times.
- Singing Hills Rd (CR 166) may currently experience some traffic congestion during peak times or special events, but typically operates at an acceptable Level of Service.
- In the future, new or expanded roadway connections will help decrease traffic congestion and reduce the reliance on CO 86.
- Widening of CO 86 is necessary to accommodate current and future travel demands.
- Traffic signals on CO 86 could be installed at various locations near the Town of Elizabeth when they are warranted.
- A thoroughly detailed corridor study specific to CO 86 will help provide a long-term vision for the highway that addresses the current and future mobility needs of the Town and the surrounding region.
- Existing and proposed paths and sidewalks in the Town of Elizabeth will help safely and efficiently allow for multi-modal travel.
- Local input received during the development of this plan expressed interest in improving equestrian trails and amenities in the Town and Elizabeth and surrounding areas.
- Although most vehicles on the road today are gasoline or diesel powered, the Town should anticipate and plan for a greater number of gas-electric hybrid, plug-in hybrid, and electric vehicles in the future.

Implementation

The information presented in this plan represents a long-range vision to be implemented over time as growth in the area demands additional transportation infrastructure. Construction of the improvements recommended may be completed using public funding, private funding, or a combination of funding sources. The following cases or combination of cases may trigger implementation:

1. A property develops, redevelops, or changes in use. In this case, the Town of Elizabeth will require the developer to provide transportation improvements to accommodate additional traffic demand created by the development. Development driven improvements must be compatible with the 2040 Transportation Plan.

2. The Town of Elizabeth and/or Elbert County obtain or designate funding to complete a key connection, route, or trail.

3. CO 86 is identified for improvement by the Statewide Transportation Improvement Program (STIP) and State and/or Federal funding becomes available to implement improvements.

Prior to implementation, exact roadway and trail alignments must be determined through detailed engineering studies and approved by the appropriate governing entities. The Town of Elizabeth and/or Elbert County will consider items such as the existing or proposed land use(s), environmental impacts, and engineering principles. Roadways within the Town of Elizabeth boundaries must be designed according to the latest approved roadway design criteria defined by the Town Code.

Next Steps

In recognition of this plan's long-range nature, the potential for conditions to change over time, local planning partner participation, and the influence of external forces, the Town of Elizabeth plans to pursue the following, subsequent to adoption of this plan:

- Participate in Elbert County transportation planning efforts.
- Pursue an Intergovernmental Agreement (IGA) with Elbert County to establish a mutual commitment to the Town of Elizabeth 2040 Transportation Plan and its execution.
- Revisit the Town of Elizabeth 2040 Transportation Plan at appropriate intervals to evaluate whether the plan meets the Town of Elizabeth's current goals and transportation needs.
- Develop a Capital Improvement Program to prioritize and implement components of the Town of Elizabeth 2040 Transportation Plan as demanded by current conditions.
- Actively participate in local, regional, and statewide transportation planning efforts.
- Promote and support accessible nonvehicular travel through improvement and enhancement of sidewalk and trail facilities as well as amending Town of Elizabeth roadway design guidelines to include street lighting standards.
- Implement through Town regulations the access control principles mentioned in the Town of Elizabeth 2040 Transportation Plan as they relate to roadway functional classifications.

Town of Elizabeth 2040 Transportation Plan

Existing Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs

Project / Scenario Specific Inputs

Default National Factors

Section 1 - General Site Information

Site Name	Town of Elizabeth - 3 Mile - Existing Conditions

Geographic

Developed Area (in acres)	1460
Number of Intersections	350
Is Transit (bus or rail) present within the site or across the street?	No

Land Use - Surrounding Area

Is the site in a Central Business District or TOD?	No
Employment within one mile of the MXD	0
Employment within a 30 minute Transit Trip (Door-to-door)	0

Site Demographics

Enter Population Directly?		Yes
	Population	1400
Average Vehicles Owned per Dwelling Unit		1.85

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs
Project / Scenario Specific Inputs
Default National Factors

Section 2 - Variable Modeling Parameters

Conversion Factors

Average Household Size

Single Family	3.2
Multi-Family	2.5
High Rise Condo	2.5

Jobs per ksf

Retail	2.0
Office	3.0
Light Industrial	1.0
Manufacturing	0.5
Warehousing	2.0
Misc. Uses	2.0

Jobs from ITE rates per other unit

Jobs per Hotel Room	0.50
Jobs per Movie Screen	4.00
Grade School Jobs per student	0.10
High School / Middle School Jobs per Student	0.10
College Jobs per student	0.25

Trip Purpose Splits by Land Use Type
NOTE: There is no NCHRP split defined for schools, so the split has to be entered below.

		Productions			Attractions		
DAILY	**Use NCHRP?**	**HBW**	**HBO**	**NHB**	**HBW**	**HBO**	**NHB**
Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

Town of Elizabeth 2040 Transportation Plan

Existing Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs

Project / Scenario Specific Inputs

Default National Factors

AM PEAK HOUR

Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

PM PEAK HOUR

Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

NON-HOME BASED TRIPS GENERATED BY PROJECT HOUSEHOLDS

Enter the percent of these that occur…

Completely Within the Project Site	25%
With one trip end external to the Project Site	15%
Completely outside the Project Site	60%

Town of Elizabeth 2040 Transportation Plan

Existing Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs
Project / Scenario Specific Inputs
Default National Factors

Section 3 - Land Use Inputs

			Trip Equation Method			Trips			ITE Code
	Quantity	Units	Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour	Code
Number of Dwelling Units									
Single Family	496	DU	Log Equation	Linear Equatio	Log Equation	4,537	357	444	210
Multi-Family	0	DU	Linear Equatio	Linear Equatio	Linear Equati	0	0	0	220
High Rise Condo	0	DU	Linear Equatio	Linear Equatio	Linear Equati	0	0	0	232
Retail									
General Retail other than those listed below	96	ksf	Log Equation	Log Equation	Log Equation	6,600	150	618	820
Supermarket	159	ksf	Average Rate	Average Rate	Average Rate	16,293	572	1,673	850
Bank	12	ksf	Average Rate	Average Rate	Average Rate	1,829	152	319	912
Health Club	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	492
Restaurant (non-fast food)	6	ksf	Average Rate	Average Rate	Average Rate	775	70	68	932
Fast-Food Restaurant	2	ksf	Average Rate	Average Rate	Average Rate	1,196	119	82	934
Gas Station	3	ksf	Average Rate	Average Rate	Average Rate	3,212	216	264	945
Auto Repair	39	ksf	Average Rate	Average Rate	Average Rate	1,244	116	133	942
Office									
Non-Medical	3	ksf	Log Equation	Log Equation	Linear Equati	81	10	82	710
Medical	0	jobs	Average Rate	Average Rate	Average Rate	0	0	0	720
Industrial									
Light Industrial	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	110
Manufacturing	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	140
Warehousing / Self-Storage	31	ksf	Average Rate	Average Rate	Average Rate	77	5	8	151
Hotel (including restaurant, facilities, etc…)	0	Rooms	Average Rate	Average Rate	Average Rate	0	0	0	310
Motel	0	Rooms	Average Rate	Average Rate	Average Rate	0	0	0	320
Movie Theater	0	Screens	Average Rate	Average Rate	Average Rate	0	0	0	445
School									
University	0	Students	Average Rate	Average Rate	Average Rate	0	0	0	550
High School	700	Students	Average Rate	Average Rate	Average Rate	1,197	294	91	530
Middle School	450	Students	Average Rate	Average Rate	Average Rate	729	243	72	522
Elementary	125	Students	Average Rate	Average Rate	Average Rate	161	56	19	520

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs
Project / Scenario Specific Inputs
Default National Factors

	Daily	AM Peak Hour	PM Peak Hour
Trips from Land uses not covered above ==>	0	0	0
Jobs in those Land Uses	0		

	Daily	AM Peak Hour	PM Peak Hour
Total "Baseline" ITE Trips	**37,930**	**2,360**	**3,872**

Section 4 - VMT Inputs

	HBW	HBO	NHB
Average Trip Length in the Region	12.92	6.58	6.75
Average Trip Length in the Traffic Analysis Zone	0.25	0.25	0.25

Town of Elizabeth 2040 Transportation Plan

Future Land Use Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs

Project / Scenario Specific Inputs

Default National Factors

Section 1 - General Site Information

Site Name	Town of Elizabeth - 3 Mile - Future Land Use and Development

Geographic

Developed Area (in acres)	30,517
Number of Intersections	900
Is Transit (bus or rail) present within the site or across the street?	No

Land Use - Surrounding Area

Is the site in a Central Business District or TOD?	No
Employment within one mile of the MXD	0
Employment within a 30 minute Transit Trip (Door-to-door)	0

Site Demographics

Enter Population Directly?		Yes
	Population	49729
Average Vehicles Owned per Dwelling Unit		1.85

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs
Project / Scenario Specific Inputs
Default National Factors

Section 2 - Variable Modeling Parameters

Conversion Factors

Average Household Size

Single Family	3.2
Multi-Family	2.5
High Rise Condo	2.5

Jobs per ksf

Retail	2.0
Office	3.0
Light Industrial	1.0
Manufacturing	0.5
Warehousing	2.0
Misc. Uses	2.0

Jobs from ITE rates per other unit

Jobs per Hotel Room	0.50
Jobs per Movie Screen	4.00
Grade School Jobs per student	0.10
High School / Middle School Jobs per Student	0.10
College Jobs per student	0.25

Trip Purpose Splits by Land Use Type
NOTE: There is no NCHRP split defined for schools, so the split has to be entered below.

		Productions			Attractions		
DAILY	**Use NCHRP?**	**HBW**	**HBO**	**NHB**	**HBW**	**HBO**	**NHB**
Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

Town of Elizabeth 2040 Transportation Plan

Future Land Use Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs

Project / Scenario Specific Inputs

Default National Factors

AM PEAK HOUR

Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

PM PEAK HOUR

Residences	Yes	15%	50%	10%	7%	8%	10%
Retail	Yes	0%	0%	15%	10%	60%	15%
Office	Yes	0%	0%	15%	35%	35%	15%
Other non-residential (excluding schools)	Yes	0%	0%	10%	60%	20%	10%
Schools	No	0%	0%	2.5%	35%	60%	3%

NON-HOME BASED TRIPS GENERATED BY PROJECT HOUSEHOLDS

Enter the percent of these that occur…

Completely Within the Project Site	25%
With one trip end external to the Project Site	15%
Completely outside the Project Site	60%

Town of Elizabeth 2040 Transportation Plan

Future Land Use Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs
Project / Scenario Specific Inputs
Default National Factors

Section 3 - Land Use Inputs

			Trip Equation Method			Trips			ITE Code
	Quantity	**Units**	Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour	**Code**
Number of Dwelling Units									
Single Family	17,824	DU	Log Equation	Linear Equatior	Log Equation	122,423	12,487	11,153	210
Multi-Family	0	DU	Linear Equatior	Linear Equatior	Linear Equati	0	0	0	220
High Rise Condo	0	DU	Linear Equatior	Linear Equatior	Linear Equati	0	0	0	232
Retail (note: if you use job units for retail, the spreadsheet will convert before applying trip rates, using the rate in section 2 which you can change)									
General Retail other than those listed below	4076	ksf	Log Equation	Log Equation	Log Equation	75,614	1,373	7,629	820
Supermarket	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	850
Bank	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	912
Health Club	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	492
Restaurant (non-fast food)	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	932
Fast-Food Restaurant	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	934
Gas Station	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	945
Auto Repair	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	942
Office									
Non-Medical	1275	ksf	Log Equation	Log Equation	Linear Equati	9,469	1,437	1,506	710
Medical	0	jobs	Average Rate	Average Rate	Average Rate	0	0	0	720
Industrial									
Light Industrial	0	jobs	Average Rate	Average Rate	Average Rate	0	0	0	110
Manufacturing	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	140
Warehousing / Self-Storage	0	ksf	Average Rate	Average Rate	Average Rate	0	0	0	151
Hotel (including restaurant, facilities, etc…)	0	Rooms	Average Rate	Average Rate	Average Rate	0	0	0	310
Motel	0	Rooms	Average Rate	Average Rate	Average Rate	0	0	0	320
Movie Theater	0	Screens	Average Rate	Average Rate	Average Rate	0	0	0	445
School									
University	0	Students	Average Rate	Average Rate	Average Rate	0	0	0	550
High School	700	Students	Average Rate	Average Rate	Average Rate	1,197	294	91	530
Middle School	450	Students	Average Rate	Average Rate	Average Rate	729	243	72	522
Elementary	125	Students	Average Rate	Average Rate	Average Rate	161	56	19	520

Town of Elizabeth 2040 Transportation Plan

Future Land Use Trip Generation

MIXED USE TRIP GENERATION MODEL V4 - INPUT

All shaded cells are inputs

Project / Scenario Specific Inputs

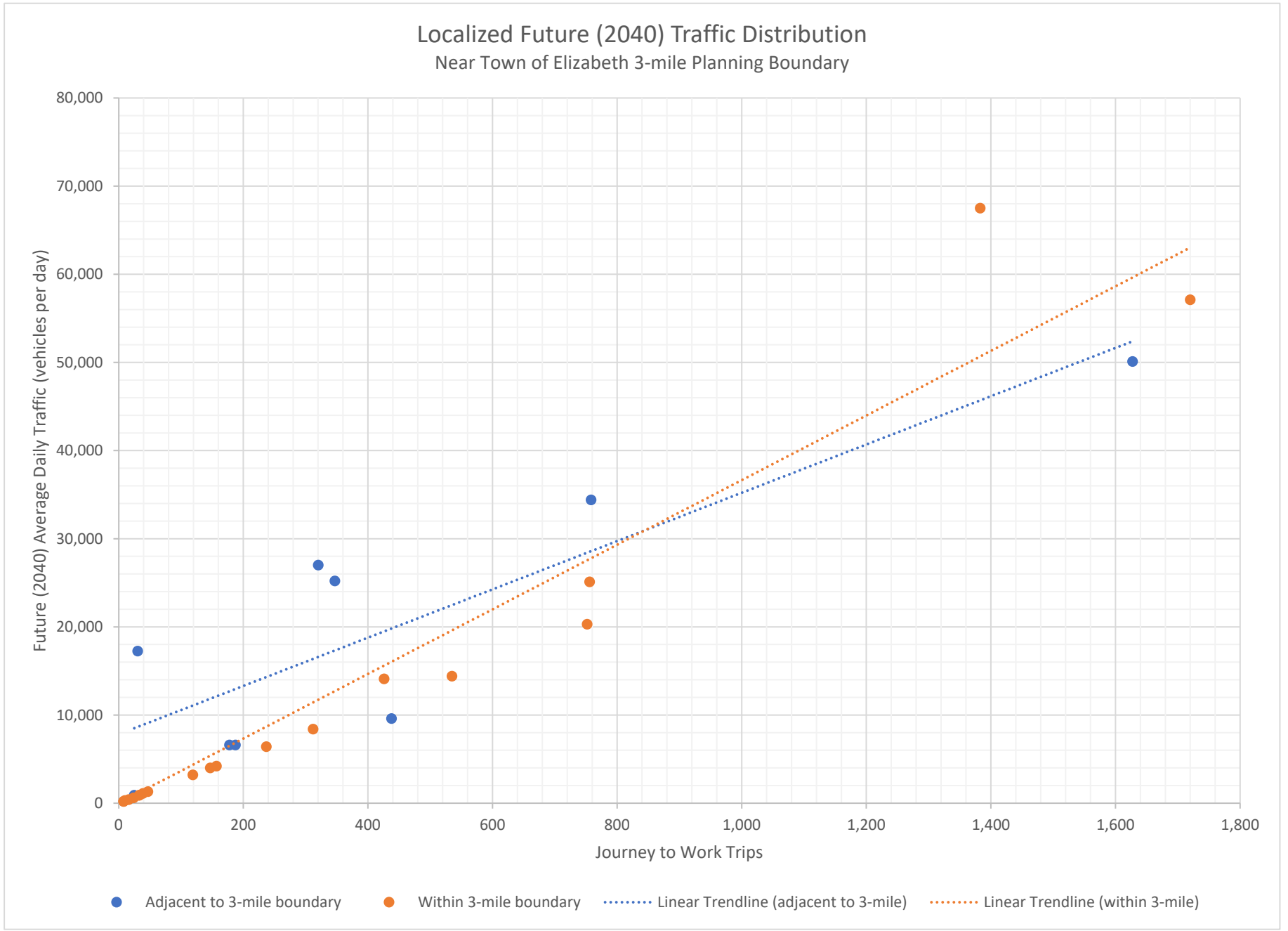
Default National Factors

	Daily	AM Peak Hour	PM Peak Hour
Trips from Land uses not covered above ==>	0	0	0
Jobs in those Land Uses	0		

	Daily	AM Peak Hour	PM Peak Hour
Total "Baseline" ITE Trips	**209,593**	**15,890**	**20,470**

Section 4 - VMT Inputs

	HBW	HBO	NHB
Average Trip Length in the Region	12.92	6.58	6.75
Average Trip Length in the Traffic Analysis Zone	0.25	0.25	0.25


Localized Future (2040) Traffic Distribution
Near Town of Elizabeth 3-mile Planning Boundary
Future (2040) Average Daily Traffic (vehicles per day)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
Journey to Work Trips
Adjacent to 3-mile boundary
Within 3-mile boundary
Linear Trendline (adjacent to 3-mile)
Linear Trendline (within 3-mile)