Town of Windsor

TRANSPORTATION MASTER PLAN

FINAL REPORT

Final - March 2020

2020

TOWN OF WINDSOR COLORADO

FEHR PEERS

FOX TUTTLE

Table of Contents

01
EXECUTIVE SUMMARY

07
01 | INTRODUCTION

09
02 | EXISTING CONDITIONS SUMMARY

25
03 | PUBLIC OUTREACH: PROCESS AND WHAT WE HEARD

33
04 | VISION, GOALS, AND PERFORMANCE MEASURES

37
05 | PEDESTRIAN AND BICYCLE NETWORKS

53
06 | TRANSIT

61
07 | ROADWAY NETWORK

69
08 | SAFETY

75
09 | PROGRAMS & POLICIES

83
10 | EMERGING MOBILITY

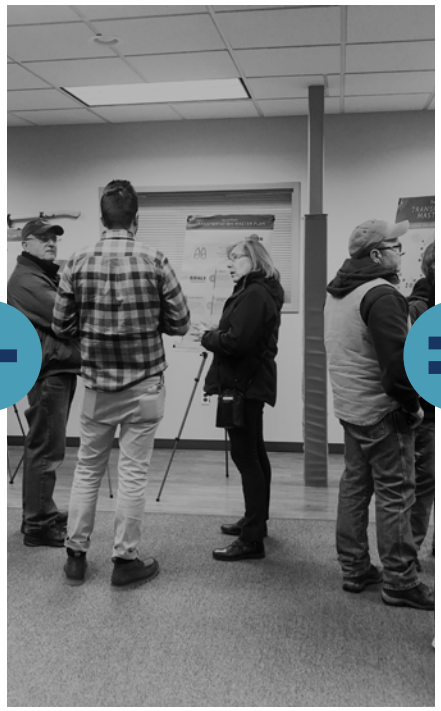
93
11 | IMPLEMENTATION ROADMAP

120
APPENDICES

Executive Summary

The process for developing the Transportation Master Plan was:

EXISITING CONDITIONS



OUTREACH

public/stakeholder/Town Board

VISION

and prioritized set of recommendations for transportation in Windsor

The TMP set the vision statement that:

Windsor's transportation system will serve all ages and abilities through a connected, multimodal network that is safe, equitable, efficient, comfortable, and intuitive.

In order to accomplish this vision, the TMP proposes the following **INFRASTRUCTURE RECOMMENDATIONS** *for each transportation mode:*

A PEDESTRIAN PROGRAM TO COMPLETE THE PEDESTRIAN NETWORK WITH SIDEWALKS, ENHANCED CROSSINGS, AND ADA ACCESSIBILITY

A CONNECTED AND COMPREHENSIVE BICYCLE NETWORK WITH LOW-STRESS BICYCLE FACILITIES

UPDATES AND PRIORITIZATION OF THE ROADWAY IMPROVEMENT PLAN (2017)

These infrastructure recommendations are supplemented by **PROGRAMMATIC AND POLICY RECOMMENDATIONS:**

TRANSIT: SUPPORT FOR THE REGIONAL GREELEY-EVANS TRANSIT SERVICE

SAFETY: IMPLEMENT A CRASH REDUCTION PROGRAM TO DECREASE THE CRASH RATE OVER TIME

SAFE ROUTES TO SCHOOL: EXPAND AND FORMALIZE THE SAFE ROUTES TO SCHOOL PROGRAM

MAINTENANCE: MAINTAIN ALL VEHICULAR, BICYCLE, AND PEDESTRIAN FACILITIES WITH PRIORITIZED AND SCHEDULED REPAVING, DEBRIS AND SNOW REMOVAL

EMERGING MOBILITY: CONTINUE TO EXPLORE AND LEVERAGE EMERGING MOBILITIES SUCH AS SHARED MOBILITY, MOBILITY AS A SERVICE, ELECTRIC VEHICLES, AND AUTONOMOUS AND CONNECTED VEHICLES

IMPLEMENTATION: PURSUE NEW INTERNAL AND EXTERNAL FUNDING SOURCES TO IMPLEMENT THE PRIORITIZED PROJECTS AND GUIDE IMPLEMENTATION THROUGH PARTNERSHIPS WITH DEVELOPERS, AGENCIES, AND NEIGHBORING JURISDICTIONS

MONITORING AND PERFORMANCE MEASURES: ANNUALLY TRACK THE TMP GOALS THROUGH PERFORMANCE MEASURES AND METRICS

Summary of Recommendations.

SAFETY
Institute an Annual Road Safety Program
Adopt and promote a Town-wide Toward Vision Zero initiative
Develop a Downtown Bicycle and Pedestrian Safety Plan
TRANSIT
Prioritize infrastructure, programs, and transportation service connections around transit to address the first/last mile gap
Educate and market transit options to potential users and educate non-users on the value of providing transit service
Invest in significant, high quality bus stop amenities and infrastructure including benches, shelters, pedestrian-scale lighting, and bike parking
Conduct a feasibility study for a local on-demand ride-hailing service
SAFE ROUTES TO SCHOOL (SRTS)
Formalize a SRTS program and implement in identified high priority schools (as identified in Chapter 9 of the TMP)
Incorporate encouragement and education through marketing, promoting and incentivizing walking and biking
Leverage unique funding sources
TRANSPORTATION DEMAND MANAGEMENT (TDM)
Market and promote transportation options
Support employer-led TDM programs
Enhance and maintain bus stop amenities
CONNECTIVITY
Implement bicycle/pedestrian cut-thrus to connect dead ends and cul-de-sacs. Strive to connect neighboring properties, both residential and commercial land uses.
Explore a policy and zoning modifications to limit the number of cul-de-sacs per area
EMERGING MOBILITY
Micromobility: Continue to evaluate the micromobility landscape to determine if Windsor should establish permits, policies, or partnerships regarding micromobility such as bike or scooter share
Car share: Continue public and stakeholder dialogue about car share and talk with potential private providers about the nature of a public private partnership
Electric vehicles: Begin planning for future electric vehicle (EV) integration by considering provision of on-street and off-street EV parking and charging stations on public property as well as incentives and requirements for the provision of EV charging stations and infrastructure by developers

Autonomous and Connected Vehicles: Consider infrastructure and policy decisions to support the positive opportunities that autonomous and connected vehicles (AV/CVs) offer
Mobility as a Service: Encourage and facilitate Mobility as a Service (MaaS) by requiring open data sources for all transportation providers, creating a platform for integrated payment, and fostering public private partnerships with private providers and third-party mobile phone app developers.
PEDESTRIAN PROGRAM
Conduct an ADA Transition Plan in order to inventory the pedestrian network and identify the location and amount of insufficient or damaged sidewalks, curb ramps, and crossings
Dedicate an annual funding source for sidewalk completion, enhancement and crossing improvements; include part-time program management
Complete about 1,000 feet of missing sidewalk gaps a year
Apply the Town's Pedestrian Crossing Guidelines, to plan, design and implement one to two enhanced pedestrian crossings a year
BICYCLE NETWORK
Implement projects to complete the low-stress bicycle network per Figure 28, including comfortable crossings
Implement a bicycle wayfinding program including branding and sign locations
ROADWAY NETWORK
Implement projects to complete the roadway network per Figure 47
MAINTENANCE
Enhance the current pavement maintenance and sidewalk concrete replacement program to include standards and upkeep for bicycle facilities and preventative maintenance on high-use facilities and those with vulnerable users.
Set a routine maintenance schedule for traffic signals, walk signals, and pedestrian signal devices
Take geospatial inventory of all multimodal signs, such as signs indicating the presence of bicyclists and pedestrians; repair and replace signs as necessary
Continue to work with CDOT, regional partners, and neighboring jurisdictions to create truck routes to minimize maintenance needs, by focusing impact on specified corridors
Update the prioritization of roadways that receive plowing after a snow storm, considering the presence of bicycle facilities and access to key destinations
Build off the existing Snow and Ice Control Plan to address the plowing of bicycle and pedestrian facilities; multimodal infrastructure cleared within 24 hours of a snow storm
Solidify a response team to deploy for the investigation of maintenance issues or complaints, and develop a team to improve resolution time
IMPLEMENTATION ROADMAP
Form a working group with residents and business to gauge support and leadership for new funding sources that would require voter approval
Expand the use of grant funding through additional resources and strategically consider the best opportunities for the investment in completing grant applications
Collaborate with the private sector to make financial contributions toward multimodal projects. Set aside funding to ensure that any privately funded projects can be properly connected to the existing network.
Implement and build on the 2019 complete streets standards updates

1 | Introduction

THE COMPLETION OF THE TOWN OF WINDSOR'S FIRST TRANSPORTATION MASTER PLAN (TMP) SERVES AS A MILESTONE TO ASSESS WHERE THE COMMUNITY IS TODAY AND A GUIDE FOR THE COMMUNITY AS IT CONTINUES TO LOOK FORWARD.

The completion of the Town of Windsor's first Transportation Master Plan (TMP) serves as a milestone to assess where the community is today and a guide for the community as it continues to look forward.

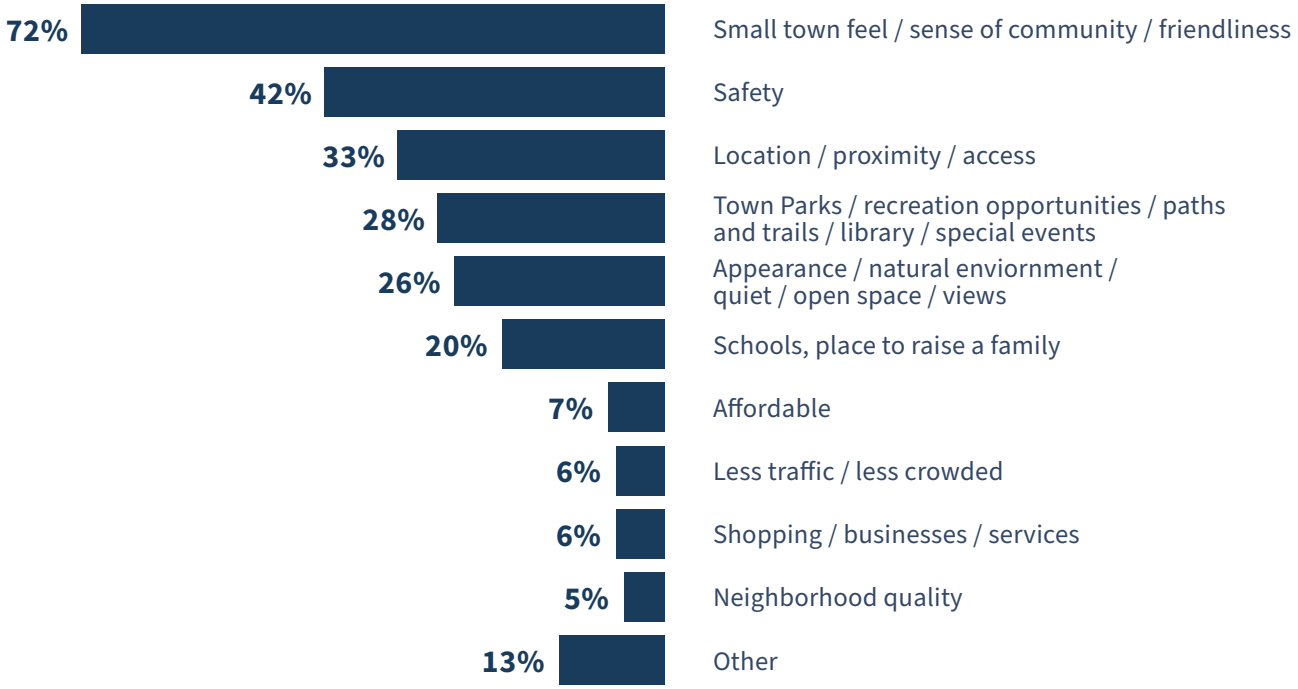
Windsor was formally incorporated in 1890 and saw rapid growth in the early 1900's with the introduction of the Greeley, Salt Lake and Pacific Railway that brought investors and farmers to the area. That growth continued into the mid-1900's with the opening of the Kodak plant east of town. Today, residents, employees and visitors move to Windsor for its convenient location, expanding retail base, growing inventory of housing, strong economy, and regional job growth in manufacturing, health care and other professional services. Over the 130 years since its incorporation, the Town has grown its boundaries, densified, and expanded its transportation network to serve both local and regional travel. This expansion has led to economic vitality

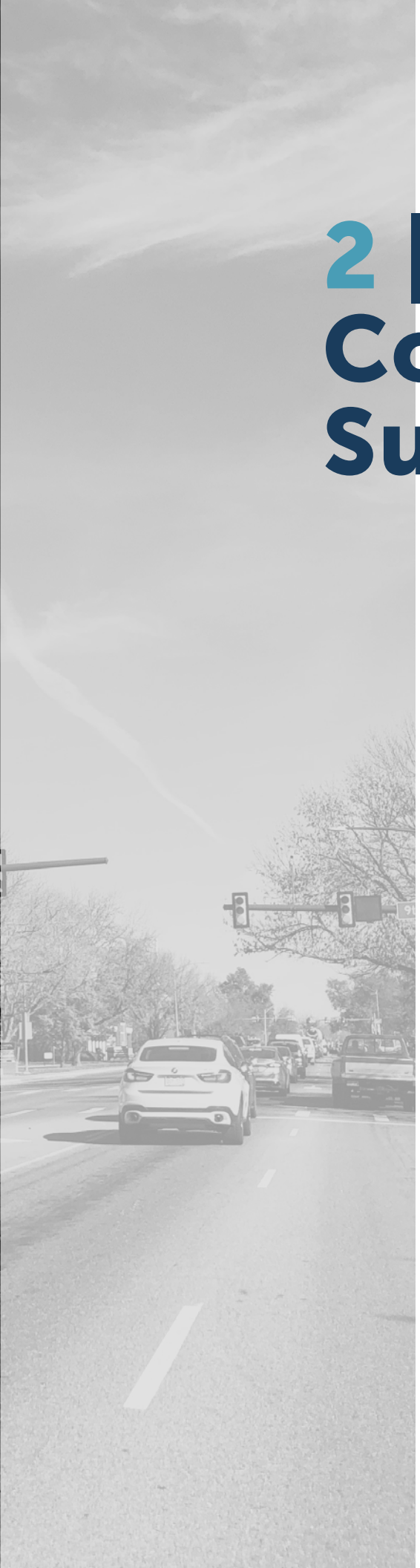
and high quality of life. At the same time, commuting to and from surrounding communities increases demand and congestion on Windsor roadways given the Town's proximity to Fort Collins, Loveland, Greeley and other growing communities with strong job hubs.

Transportation plays an important role in quality of life in Windsor, as reflected by the survey results of residents shown in **Figure 1**, with sense of community, safety, access, and trails as the top values. As the community grows, planning for an efficient, comfortable, and convenient multimodal transportation network is becoming increasingly important. The Windsor TMP does that by identifying a long-term vision for multimodal transportation as well as short-term action items for implementation. The TMP integrates the *2017 Roadway Improvement Plan* to identify a layered transportation network that plans for a connected, efficient, and comfortable network for bicycling, walking, taking transit, and driving. The TMP was developed with comprehensive public outreach through multiple communication mediums targeted to residents, stakeholders, employees and business owners of the Town. This engagement process provided meaningful input that informed the recommendations and priorities of this plan.

Figure 1: *Top 3 things residents value about living in Windsor (The National Citizen Survey 2017)*

WHAT ARE THE TOP THREE THINGS YOU VALUE MOST ABOUT LIVING IN WINDSOR?





2 | Exisiting Conditions Summary

ASSESSING THE CURRENT CONDITION OF WINDSOR—DEMOGRAPHICS, INFRASTRUCTURE, PROGRAMS, SERVICES, AND DATA—IS A FOUNDATIONAL ELEMENT OF THE TMP.

This chapter provides the necessary building blocks to establish a transportation needs assessment and thus future recommendations and priorities. **Appendix A** contains the complete Existing Conditions Technical Memorandum in further detail.

The TMP is founded on a number of transportation-related studies and plans completed in Windsor. These are summarized in detail in **Appendix A** and include the *Town of Windsor Strategic Plan; Pedestrian Crossing Guidelines; Windsor Complete Streets Guide; Comprehensive Plan; Parks, Recreation and Culture Master Plan; CO 257 and CO 392 Network Feasibility Study;* and regional plans such as the *2040 North Front Range Metropolitan Planning Organization Regional Transportation Plan.*

DEMOGRAPHICS AND LAND USE

As Windsor's land use and population change over time, the transportation demands of the community will also shift. This section summarizes findings from the *2016 Comprehensive Plan and the Demographics and Housing Study* (2015), as they impact transportation.

Windsor is growing quickly, with a doubling of the population from 2000 to 2010 and a 83% increase in population from 2010 to 2020, as shown in **Table 1**. This growth has outpaced the surrounding North Front Range region (characterized by the North Front Range Municipal Planning Organization (NFRMPO)). The Windsor community is aging, with the population over the age of 55 increasing by 34% between 2010 and 2015 and forecasted to continue to grow at a steady rate.

Windsor's 2019 median household income was approximately $86,410, compared to the region's median household income of $64,980. Median household income is expected to continue to increase. As shown in **Figure 2**, the number of jobs in Windsor grew 50% between 2002 and 2011, a rate that outpaced nearby Fort Collins and Greeley. However, nearly 90% of all new employees in Windsor commuted in from other locations as shown in **Figure 3**. In 2015, only 6% of the local workforce lived in Windsor, meaning 94% of Windsor's workforce and residents were commuting out of Town. **Figure 4** shows the breakdown of Windsor residents and employees, displaying the number of people commuting into and out of Town on a daily basis.

Table 1: *Windsor demographic summary (2016 Comprehensive Plan updated with 2019 Census Data)*

	2000	2010	2015	2020	PROJECTED CHANGE (2010 TO 2020)	
POPULATION	9,896	18,644	22,021	34,143	+15,499	+83%
HOUSEHOLDS	3,563	6,732	8,003	12,067	+5,335	+79%

Figure 2: *Windsor's primary jobs (2016 Comprehensive Plan)*

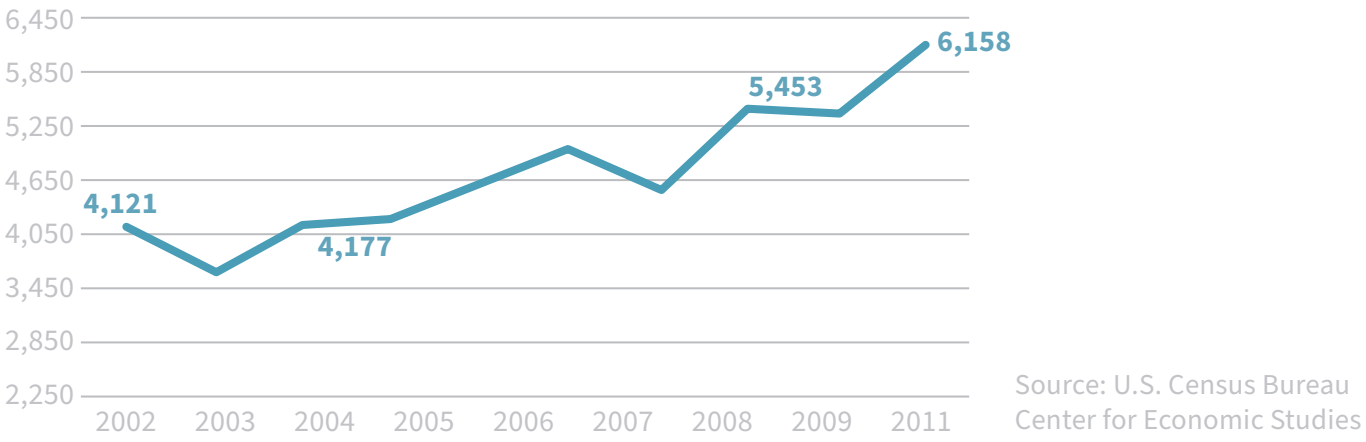
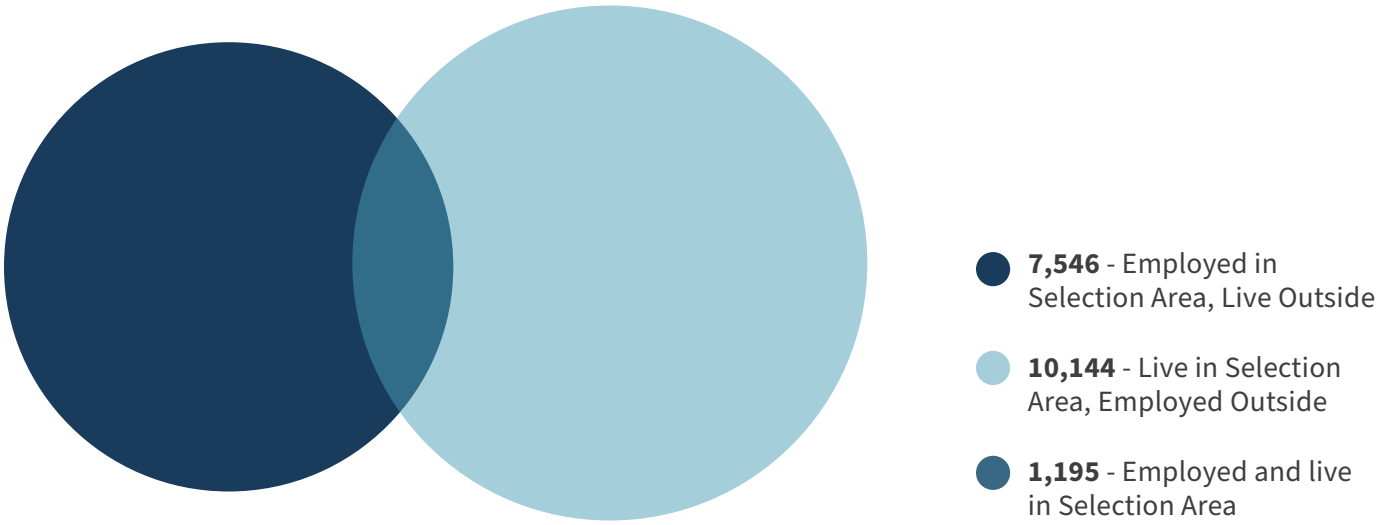


Figure 3: *2011 Commuting destinations (2015 Demographics and Housing Study)*

Figure 4: *2015 Inflow/outflow job counts (Longitudinal Employer Household Dynamics (LEHD))*

WORKER FLOWS



PEDESTRIAN AND BICYCLE NETWORK

Windsor is roughly bisected by the Poudre River on a northwest to southeast axis. There are a number of natural barriers (rivers, lakes, canals), discontinuities in the street grid, and topography fluctuations that create challenges in developing a direct, connected and accessible walking and bicycling network between the northeast and southwest areas of Windsor. There are also gaps in the network between the west part of town and downtown core. Despite these challenges, Windsor has an extensive trail network and a growing on-street bicycle facilities and complete sidewalk network.

PEDESTRIAN NETWORK

Windsor's existing pedestrian network is comprehensive—a majority of streets have attached or detached (separated by a buffer) sidewalks, which are complemented by a trail network. Additionally, marked crosswalks, Rapid Rectangular Flashing Beacons (RRFBs), and two undercrossings provide crossings for people walking. Many of the existing marked crosswalks are located near schools, across arterial streets, or in and around the historic core of Windsor. Windsor has ten RRFBs that allow people crossing the ability to stop traffic by pressing a button that activates flashing amber lights. The locations of RRFBs are focused where trails cross

arterial roads or state highways, as well as two adjacent to Windsor High School, one across 15th Street connecting multifamily housing to a grocery store and other retail uses, and one on Jacoby Road between 15th and 17th Streets. Two undercrossings provide grade-separation for the Poudre River Trail to cross underneath SH 392 in the west part of Windsor, and under 7th Street immediately south of Eastman Park Drive. Figure 5 shows the locations of existing sidewalks, trails, and marked crossings.

Data is currently unavailable to determine where sidewalks are up to standards, ADA-accessible or low-stress (based on sidewalk type, width, and roadway characteristics). Windsor applied to become a Walk Friendly Community—a program through the Pedestrian and Bicycle Information Center (PBIC). PBIC provided feedback for the Town to become more walk friendly by focusing on updating sidewalk design standards, filling in sidewalk gaps in more rural parts of Town, improving pedestrian crossing treatments at signalized intersections, and implementing more curb extensions. In addition to these engineering treatments, Windsor should also focus on improving education, encouragement, and enforcement to make Windsor more pedestrian friendly.

BICYCLE NETWORK

Windsor's bicycle network consists of painted bike lanes, hard and soft surface trails, and some designated bike routes along road shoulders. **Figure 6** shows the existing on-street and off-street bicycle network. The existing bike lane network is approximately 4.5 miles, and includes 11th Street and Garden Drive, as well as short segments on Walnut Street, 15th Street, and others. Existing bike lanes are inconsistent; standards and stripings vary throughout the Town. The trail network consists of over 40 miles of infrastructure, most of which is hard-surface, concrete trails. The system's backbone is the Poudre River Trail which is a 10-foot wide concrete trail stretching seven miles across the Town from Larimer County Road 32E and LCR 3 in the northwest, past SH 257 in the southeast where it continues to Greeley. The Great Western Trail is another regional connector between Windsor and the Town of Severance. By 2020, a soft-surface trail will extend a total of 10.5 miles and connect Windsor, through Severance, to the Town of Eaton. The remaining local trail network stretches along portions of New Liberty Road, Eastman Park Drive, Windsor Lake, and Greeley Canal #2, and through residential subdivisions. There are five trailheads in Windsor, four of which provide access to the Poudre River Trail and the other at Belmont Ridge Open Space.

Enhanced crossings along the trail network include two undercrossings for the Poudre River Trail and five crossings with RRFBs facilitating a more comfortable crossing for the Poudre River Trail as well as trails along New Liberty Road and at Windsor Lake.

The Bicycle Friendly Community program, an arm of the League of American Bicyclists, provided feedback to help guide Windsor in becoming more bicycle friendly. High priority feedback included more bike parking, maintenance of trails and bike facilities, implementing bike boulevards on low volume streets, and protected bike lanes on high volumes streets, and implementing wayfinding signage. In addition to infrastructure improvements, this program recommended that Windsor increase education, encouragement, enforcement, and evaluation of biking.

Figure 5: *Existing sidewalk and crossing facilities*

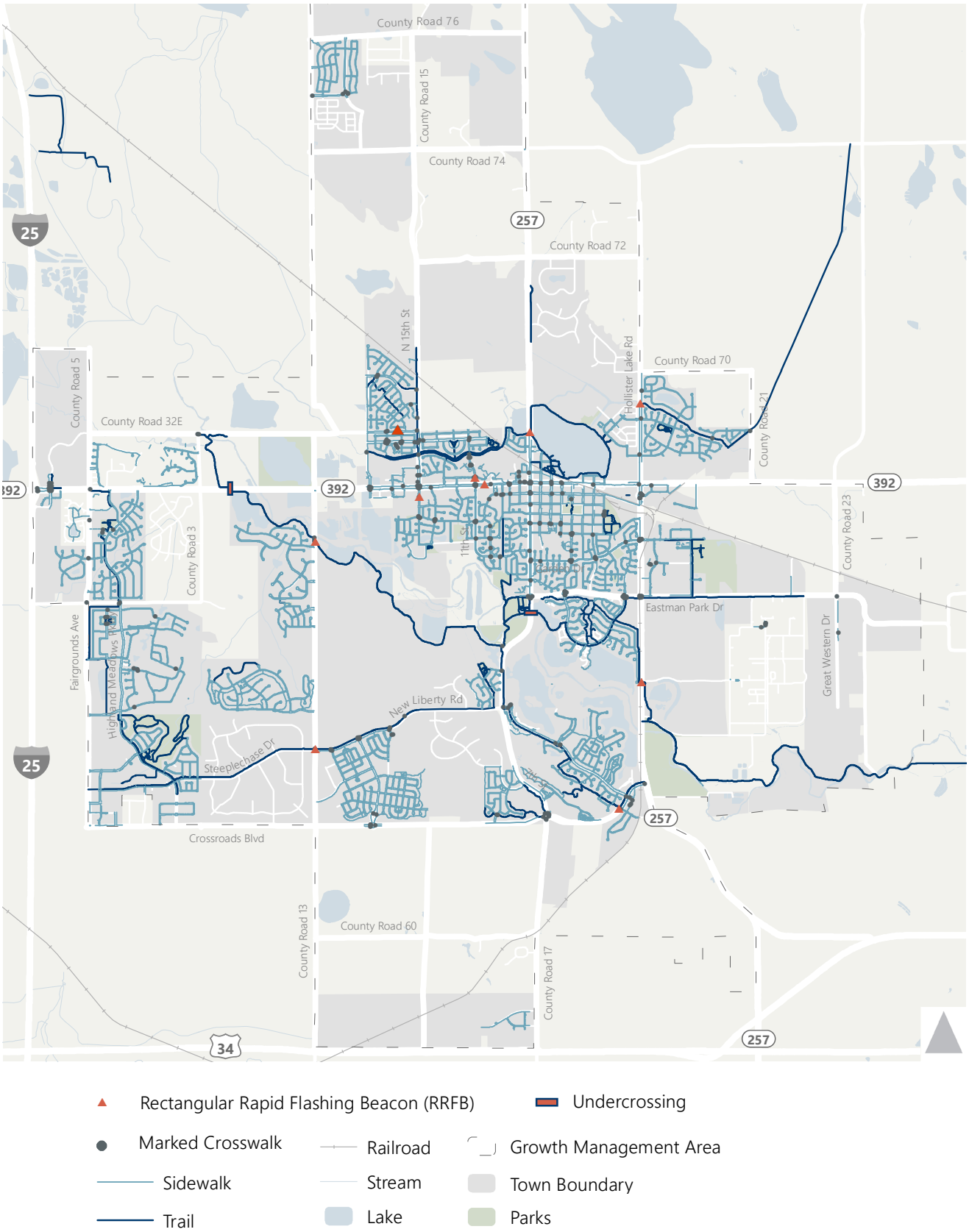
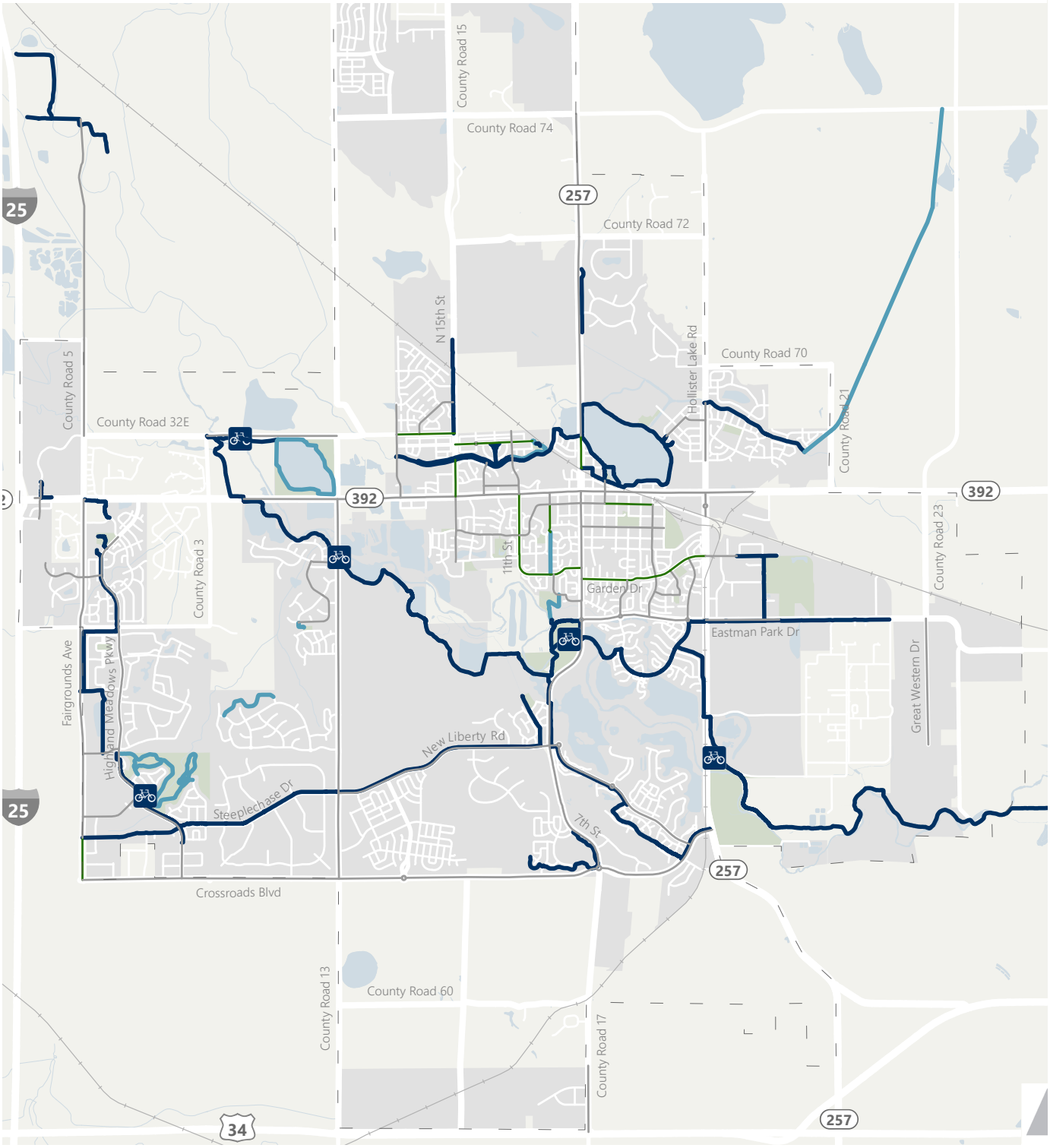


Figure 6: *Existing bicycle network*



Trailheads
Bike Lane
Hard Surface Trail
Soft Surface Trail
Shared Lane
Railroad
Stream
Lake
Growth Management Area
Town Boundary
Parks

SAFE ROUTES TO SCHOOL

In November 2018, a survey related to the transportation of elementary school students was administered to parents at five schools in Windsor. The survey received 339 responses and revealed trends on current travel behavior and perceptions of safety. **Figure 7** shows that a little over half of the respondents live within one mile of school. This is a viable distance for walking or biking. However, only about 20% walk or bike and about half of the respondents take a private vehicle to school, as shown in **Figure 8**.

Figure 7: *Distance from school (November 2018 SRTS Survey)*

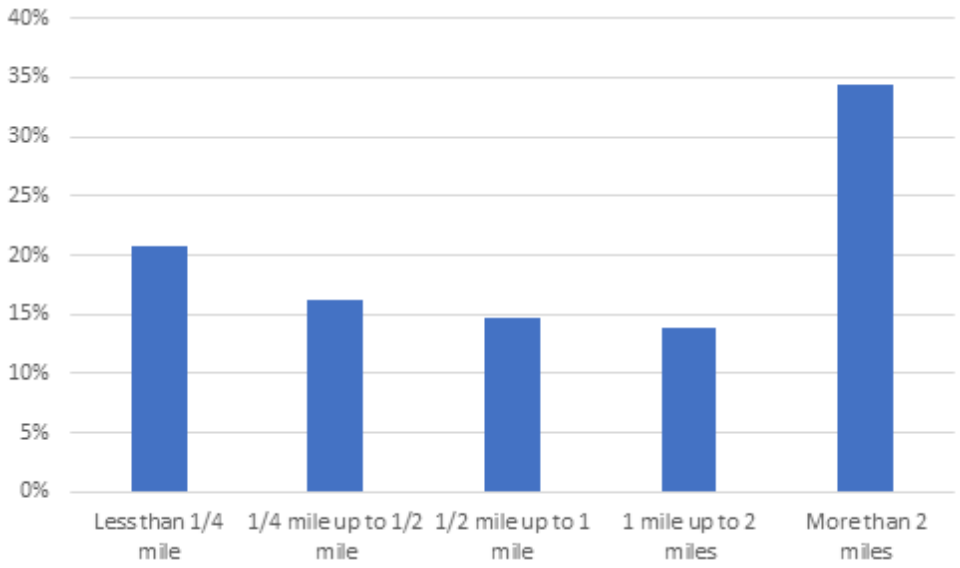
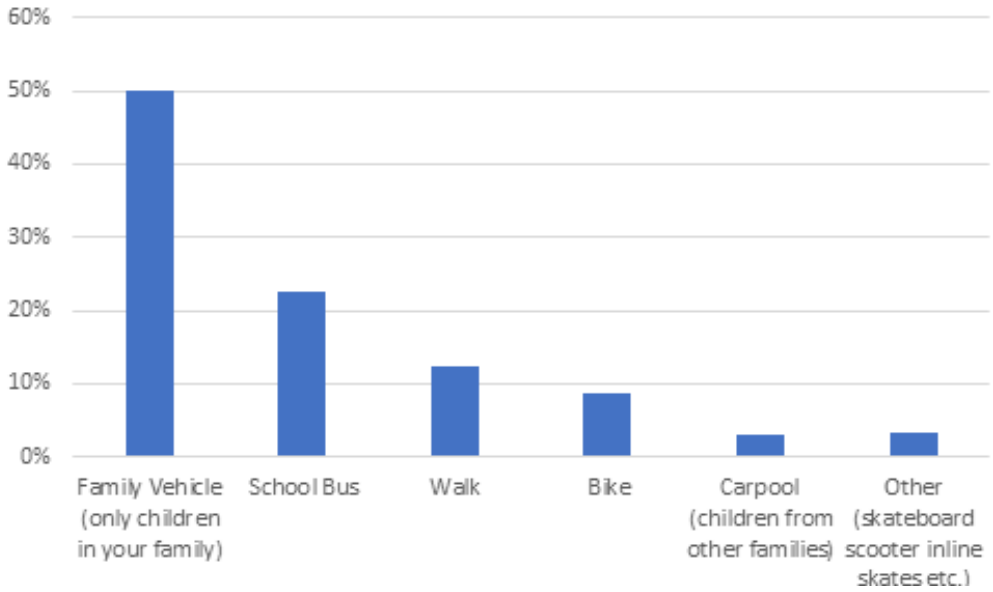


Figure 8: *How children get to school (November 2018 SRTS Survey)*



Respondents were also asked what current challenges they face when considering walking or biking to school. The top concerns were speed of traffic along their route to school (43% of respondents), amount of traffic along route (47% of respondents) and safety of intersections and crossings (45% of respondents). These concerns, in addition to the percent of families who walk and bike, acknowledge a need for more comfortable pedestrian and bicycle facilities to provide access to schools. Survey results show that separation from vehicle traffic, especially on high-speed, high-volume arterials, is an important characteristic of non-motorized facilities. The November survey also revealed that distance was a driving factor in mode choice; these results are consistent with national data that parents are significantly more likely to drive their child to school for walk trips longer than ½ mile and bike trips longer than one mile. It is also important that pedestrian and bicycle facilities are direct and on enough streets that they require little out of direction travel.

VEHICLE NETWORK

ROADWAY IMPROVEMENT PLAN (2017)

The *Roadway Improvement Plan*, adopted in September 2017, serves as an update to the *2008 Roadway Improvement Plan* to reflect the growth in the community and forecasted growth by 2040. The 2017 Plan identifies the existing roadway network, existing and future functional classification, existing and future forecasted volumes, and forecasted capacity. Based on these forecasts, the R*oadway Improvement Plan* recommended major street system improvements including widening, paving, and new roads.

STREET CLASSIFICATION

The *Roadway Improvement Plan* designated classifications of existing and future roadways, as well as segments designated for expansion from two to four travel lanes or urban street sections. Major and minor arterials function primarily as corridors of mobility, interconnecting the Town and region. Major and minor collectors function as roadways that provide access intra-town. Windsor is divided by two major arterials which are SH 257 and SH 392, that provide north-south and east-west regional connectivity. Urban sections consist of roadways with curb and gutter, sidewalks, bike lanes, and other amenities. **Figure 9** illustrates the classifications per the 2017 Plan. The TMP reviewed the *Roadway Improvement Plan's* recommendations to ensure that multimodal safety, comfort, and accessibility are further considered, and balanced with the needs of vehicular travel within and around Windsor.

EXISTING AND FORECASTED DAILY TRAFFIC

Existing and future traffic volumes were derived from Windsor's *Roadway Improvement Plan*. Certain sections of the Town's roadway network could see a significant increase in volumes as the growth of Windsor continues. **Figure 10** illustrates ranges of traffic volumes depicted by different sized circles. Existing volumes are shown in light blue while forecasted 2040 volumes are in dark blue. Those circles that do not have a light blue center are roads that are proposed but do not currently exist, while those that do not have a dark blue circle illustrate road segments that will maintain volumes within the existing volume range. Existing volumes on the Town's arterial roadway network range from 5,000 to nearly 30,000 average daily weekday vehicles. The busiest stretches of roadway include the western portion of SH 392 as it approaches I-25, and SH 257 south of SH 392. Traffic volumes are a critical measure when considering the comfort and safety of all modes and were a key factor in identifying a multimodal, layered network.

Figure 9: *Existing and proposed street classification*

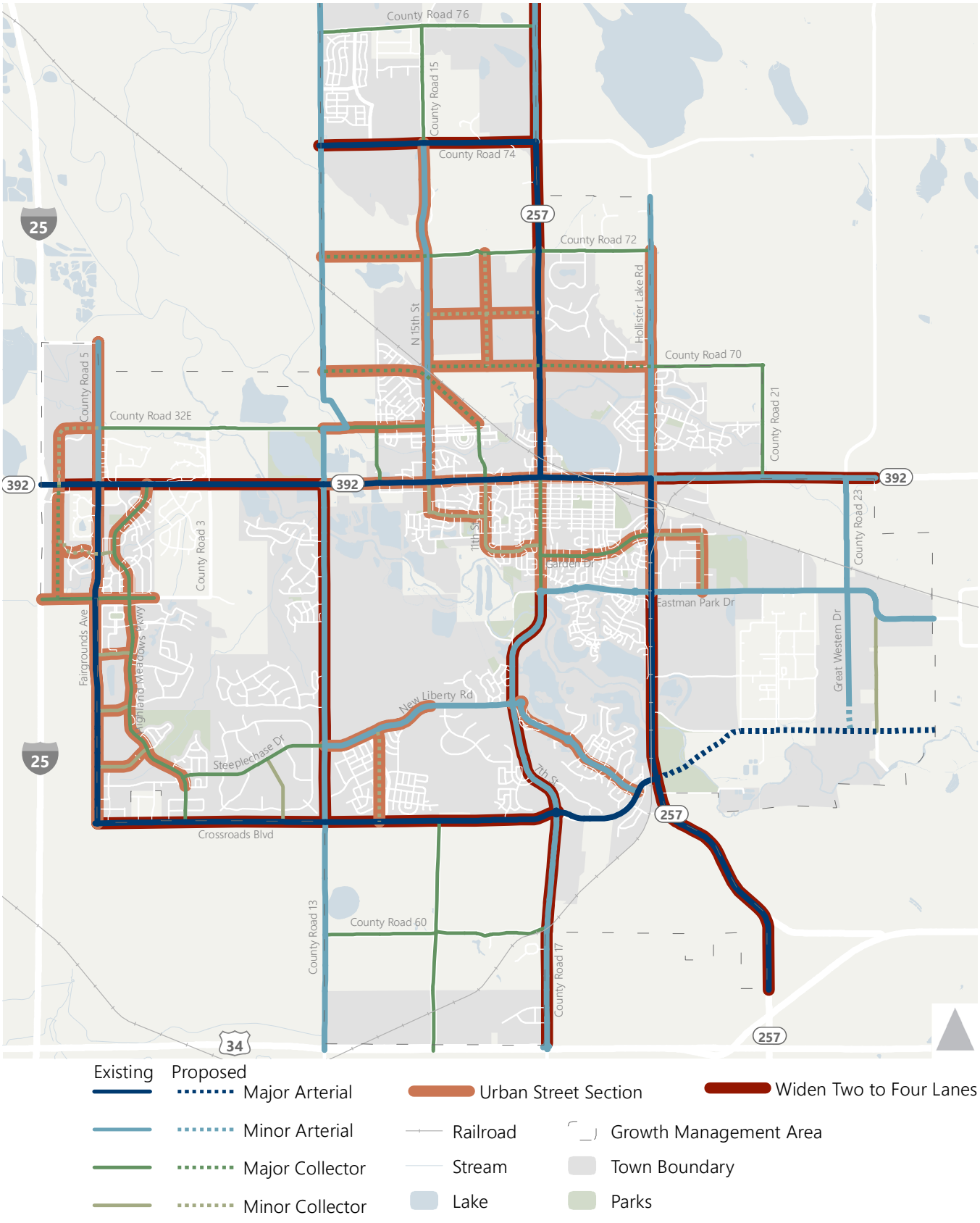
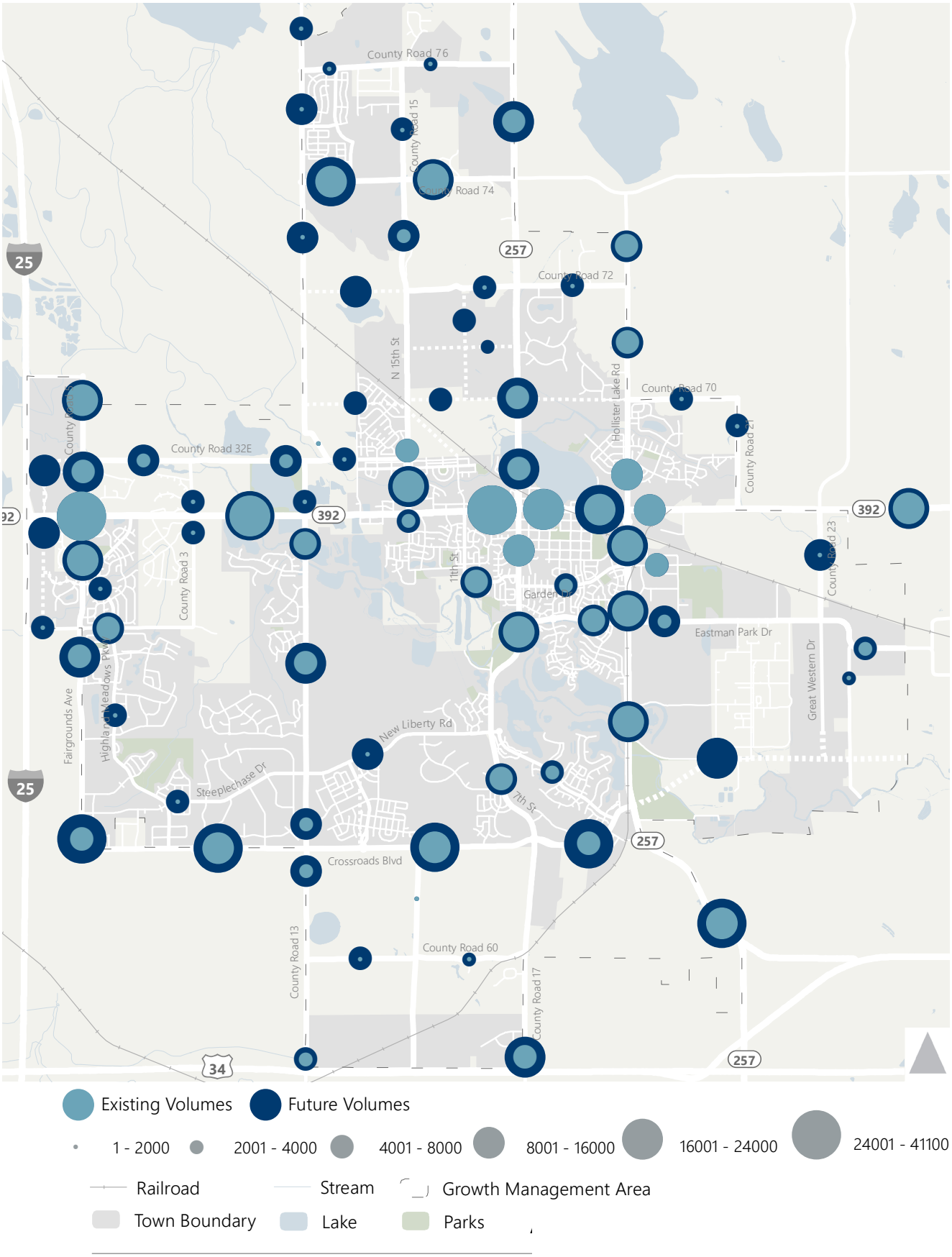


Figure 10: *Average annual daily traffic*



TRANSIT NETWORK

Windsor does not currently have local public transit, that is intended to transport users within the Town of Windsor exclusively. The TMP considers if there are viable opportunities for on-demand transportation within the Town.

Regional transit in northern Colorado has been in place or studied in some capacity since 2009. Most recently, in 2017, Greeley-Evans Transit (GET) worked alongside Transfort, CDOT, University of Northern Colorado (UNC), Colorado State University (CSU), the North Front Range Metropolitan Planning Organization (NFRMPO), and The Town of Windsor to perform a regional route demand analysis and business plan. The results of the travel pattern analysis demonstrated a need for regional transit service; this demand is only expected to grow as the population in the region is forecasted to increase significantly. The study supplemented travel data with a survey that revealed a desire and demand for this service. **Figure 11** shows Windsor residents that travel to CSU and UNC, as determined by the 2017 study. Regional transit provided by GET traveling between Greeley and Fort Collins with three stops in Windsor launched on January 2, 2020. The TMP builds off the transit study by considering first/last mile connections to the GET bus stops as well as transportation demand management strategies to incentivize transit use for Windsor residents and employees.

Figure 11: *Windsor residents traveling to Greeley and Fort Collins*

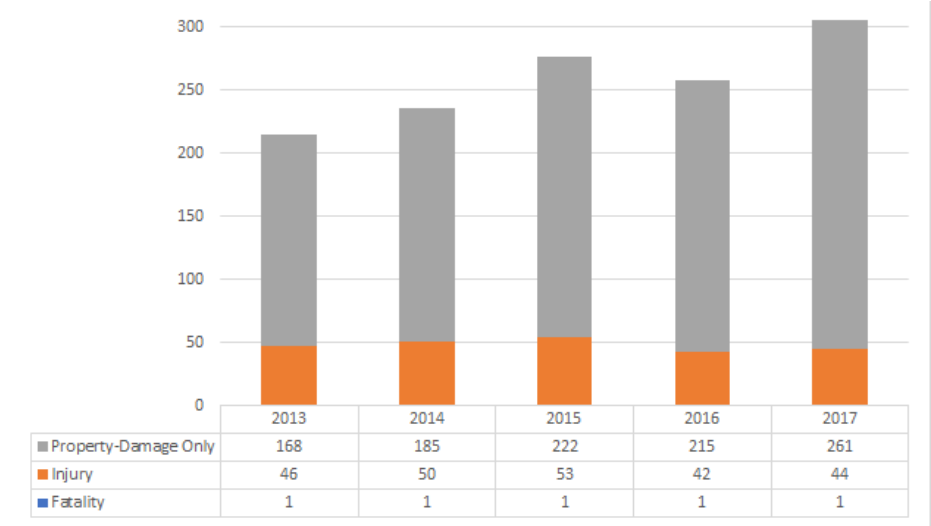
SAFETY

This section summarizes the safety performance of the existing transportation network in Windsor. Crash records have been analyzed from 2013 through 2017, the most recent complete five-year period for which records were available. The crash dataset includes all crashes that took place within the Town of Windsor or within a ¼-mile buffer around the town boundary. Crashes were analyzed based on several factors:

- Severity: Crashes are rated as fatality (FAT), injury (INJ), or property damage only (PDO)
- Crash type: Crashes are divided into categories such as head-on, sideswipe, or pedestrian
- Location within the Town of Windsor
- Location within the roadway (on-street vs. roadway departure)
- Relationship to an intersection (intersection-related, non-intersection-related, driveway access)
- Any other contributing factor (intoxication, weather, darkness, etc.)

Overall, the total number of crashes occurring in the Town of Windsor trended upward during the safety analysis period. Total crashes by severity and year are shown in **Figure 12**. Although Vehicle Miles Traveled (VMT) totals for the town are not available, the trend can be approximated from the growth in daily traffic volume at major intersections. During the study period, the daily volume at three major intersections increased by an average of 43%, while total crashes increased by 42%. Consequently, the crash rate (number of crashes per million VMT) has increased proportionally to the total number of crashes.

Figure 12: *Total crashes by year and by severity*



Crash locations can be visualized using heat maps to show which areas of the town have the highest concentration of crashes. The heat map for total crashes is shown in **Figure 13**. From the figure, it is apparent that the largest concentration of crashes occurs along Main Street (between 15th Street and Hollister Lake Road) and SH 257 (between Main Street and Eastman Park Drive). There are also hot spots of crashes occurring at several major intersections around the periphery of Town. Since these areas likely have the highest traffic volumes, it follows that they will also have the highest occurrence of crashes.

A heat map of bicycle and pedestrian crashes is shown in **Figure 14**. Bicycle and pedestrian crashes are more concentrated in the gridded street network near the center of town, and very few occurred on the outskirts. This concentration most likely indicates that bicyclists and pedestrians travel more frequently in the denser areas of town and not that these central areas are more dangerous on a per-mile-traveled basis.

In order to benchmark the safety performance against other jurisdictions in the region, crash rates can be calculated for specific intersections on the basis of crashes per Million Entering Vehicles (MEV). This calculation normalizes for the traffic volume on the road, allowing a more apples-to-apples comparison than comparing absolute crash numbers. The crash rates for five of the highest-crash intersections in Windsor are shown in **Table 2**. For comparison, the crash rates at the highest-crash intersections in Boulder are between 1.4 and 2.2 crashes/MEV.

Table 2: *Crash Rates for High-Crash Intersections*

LOCATION[1]	CRASHES / MEV
Hwy 257 and Eastman Park Dr	1.9
7th St and Main St	1.3
11th St and Main St	1.0
15th St and Main St	1.0
Hwy 257 and Main St	0.9

[1]One high-crash location (7th St/WCR 17 and WCR 62) is not included in this table because traffic volume data was not available for the crash rate calculation. The intersection of Hwy 257 and Main St was substituted instead.

Figure 13: *All crashes (2013-2017)*

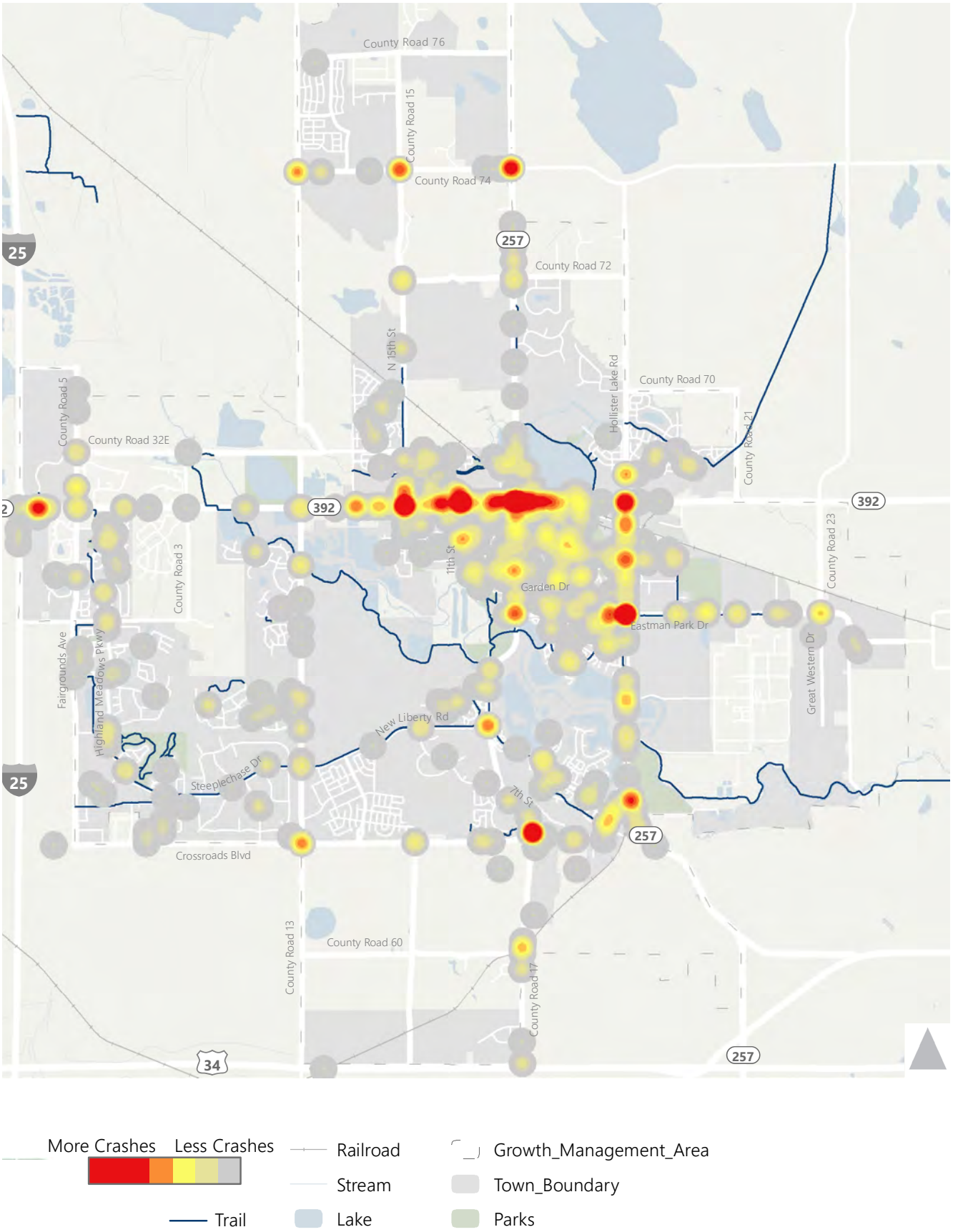
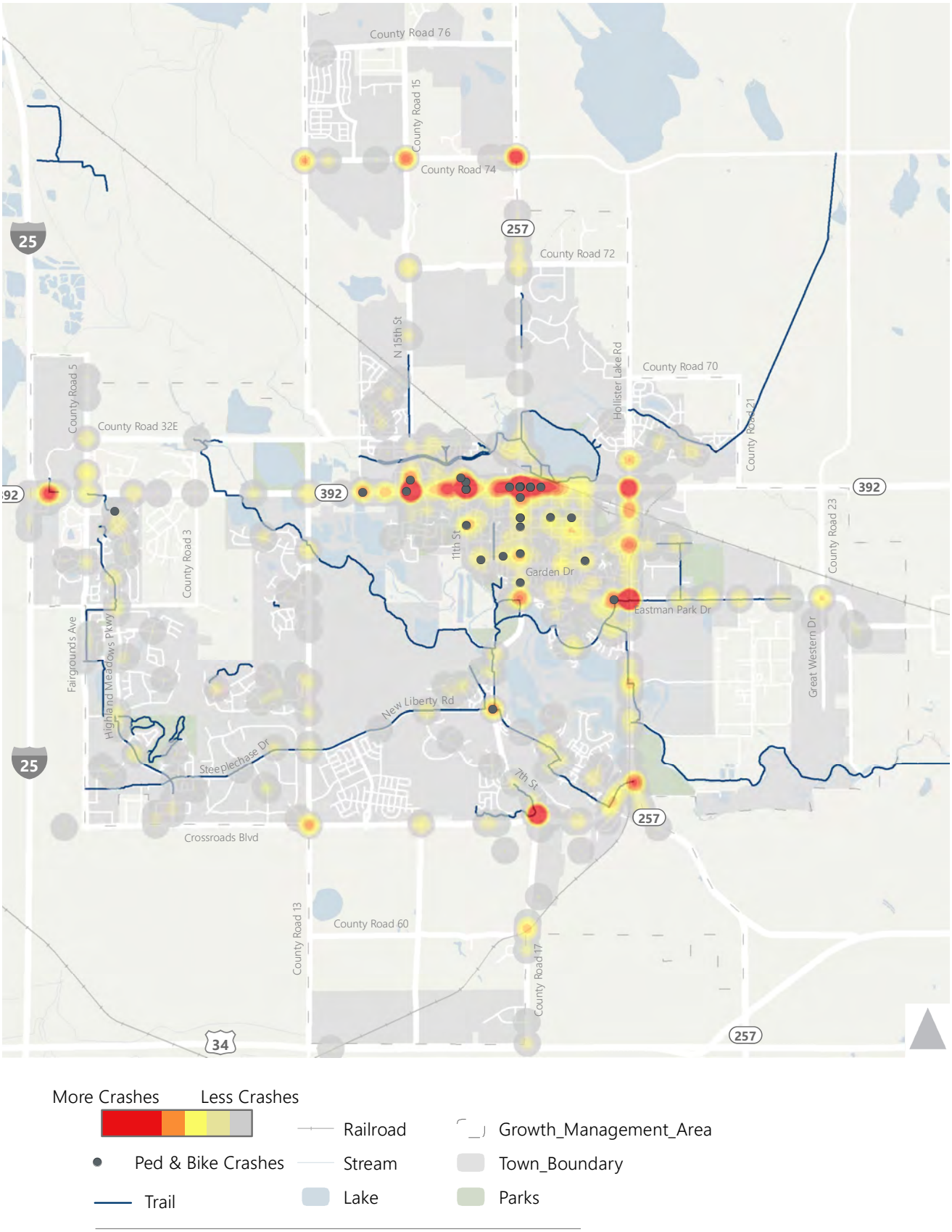


Figure 14: *Bicycle and pedestrian crashes (2013-2017)*



3 | Public Outreach: Process and What We Heard

THE WINDSOR TRANSPORTATION MASTER PLAN INCLUDED AN EXTENSIVE OUTREACH PROCESS THAT REACHED A LARGE NUMBER OF RESIDENTS, STAKEHOLDERS, EMPLOYEES, AND VISITORS FROM A CROSS SECTION OF THE COMMUNITY.

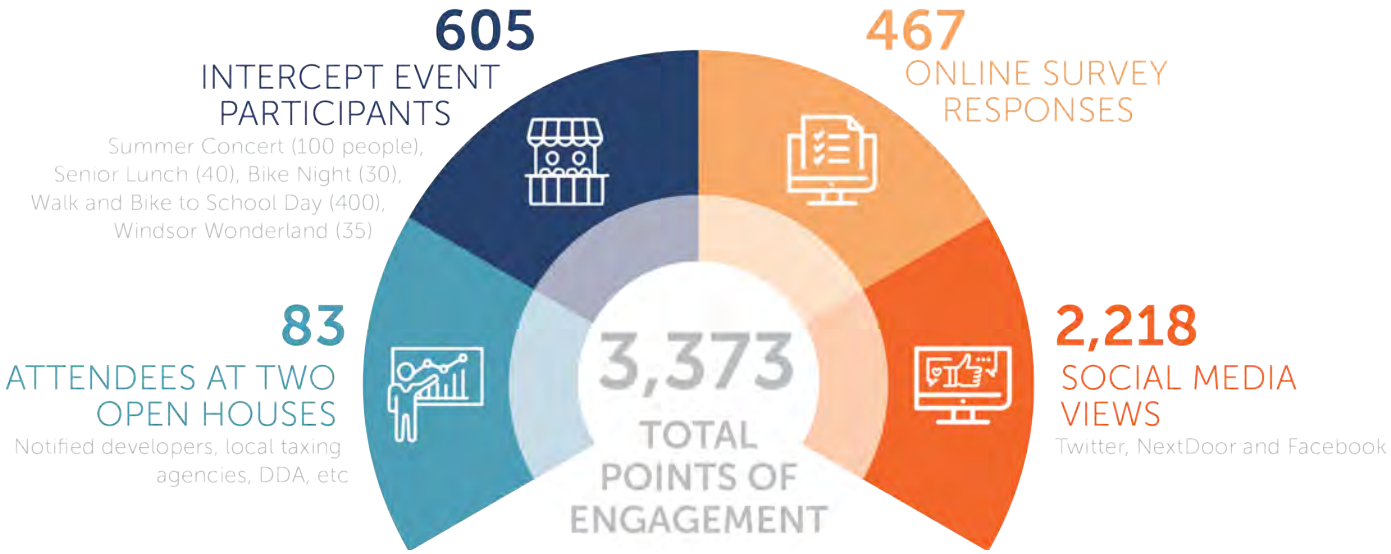
Outreach was done in two phases throughout the year-long TMP process:

Phase I (Summer 2019)- Present existing conditions and capture users' current challenges and opportunities when traveling within and through Town.

Phase II (Fall 2019)- Present draft recommendations and understand community priorities within and between biking, walking, transit, and roadway projects.

Figure 15 shows over 3,300 points of engagement captured by outreach events throughout the TMP process. The types of outreach completed and summary of feedback received is summarized in this chapter. **Appendix B** contains a compilation of the public outreach and town board presentation material.

Figure 15: *Who we heard from during outreach*



PHASE I

The first phase of outreach in Summer 2019 for the TMP consisted of gathering input from community members and stakeholders on a number of topics including:

- the vision and goals for transportation in Windsor
- specific locations that are challenging for people walking, biking, driving and taking transit
- existing conditions
- travel time
- crash locations and type
- key destinations
- preferred infrastructure to accommodate biking, walking and driving

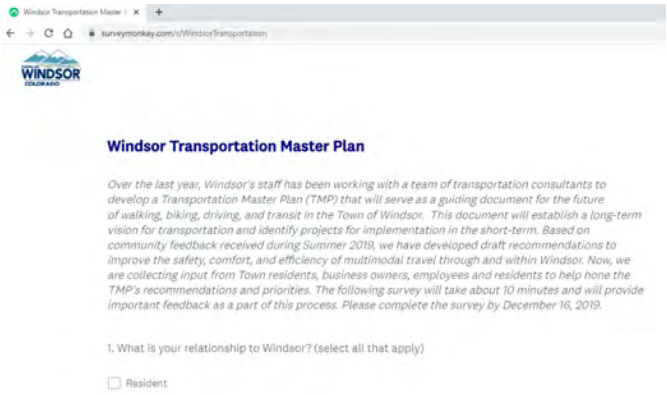
MEDIUMS FOR INPUT

Input was collected through a comprehensive set of mediums including intercept events, an online survey, a public open house, and social media.

- **Open house-** On the evening of June 10th, attendees of the public open house provided their feedback through interactive sticker dot voting, a large floor map, and voting on priorities with 'Windsor dollars.'

- **Intercept events-** For those that were unable to attend the open house, the project team went to the community and sought input at well-attended events throughout the summer including the summer concert series, Bike Night, a senior center lunch, and Walk and Bike to School Day.

- **Online survey-** An online survey was also available to gather input on respondent's current mode choices, challenges associated with walking, biking or driving, additional funding mechanisms, and specific locations.



- **Social media-** Information on the TMP was distributed widely via Facebook, Instagram and Twitter, with input gathered through social media comments.

- **Town Board, Planning Commission and Stakeholder-** Throughout the TMP process, draft information was presented for feedback to Town Board, Planning Commission and groups of stakeholders including neighboring jurisdictions and partner agencies.

WHAT WE HEARD

Attendees of the open house, intercept events, online survey, and respondents on social media contributed over 1,000 words to two word clouds (with the size of the word being proportional to the number of times that word was mentioned) that were used to inform the vision statement for the TMP. **Figure 16** displays words describing transportation in Winsor *currently*. Common themes in this word cloud include safety challenges, congestion and traffic and car-centric. **Figure 17** contains words that describe community members' visions for transportation in Windsor in the *future*. The most common themes for the future of transportation were centered around safety, efficiency and connectivity.

Figure 16: *Word cloud from the public and stakeholders on transportation in Windsor currently*

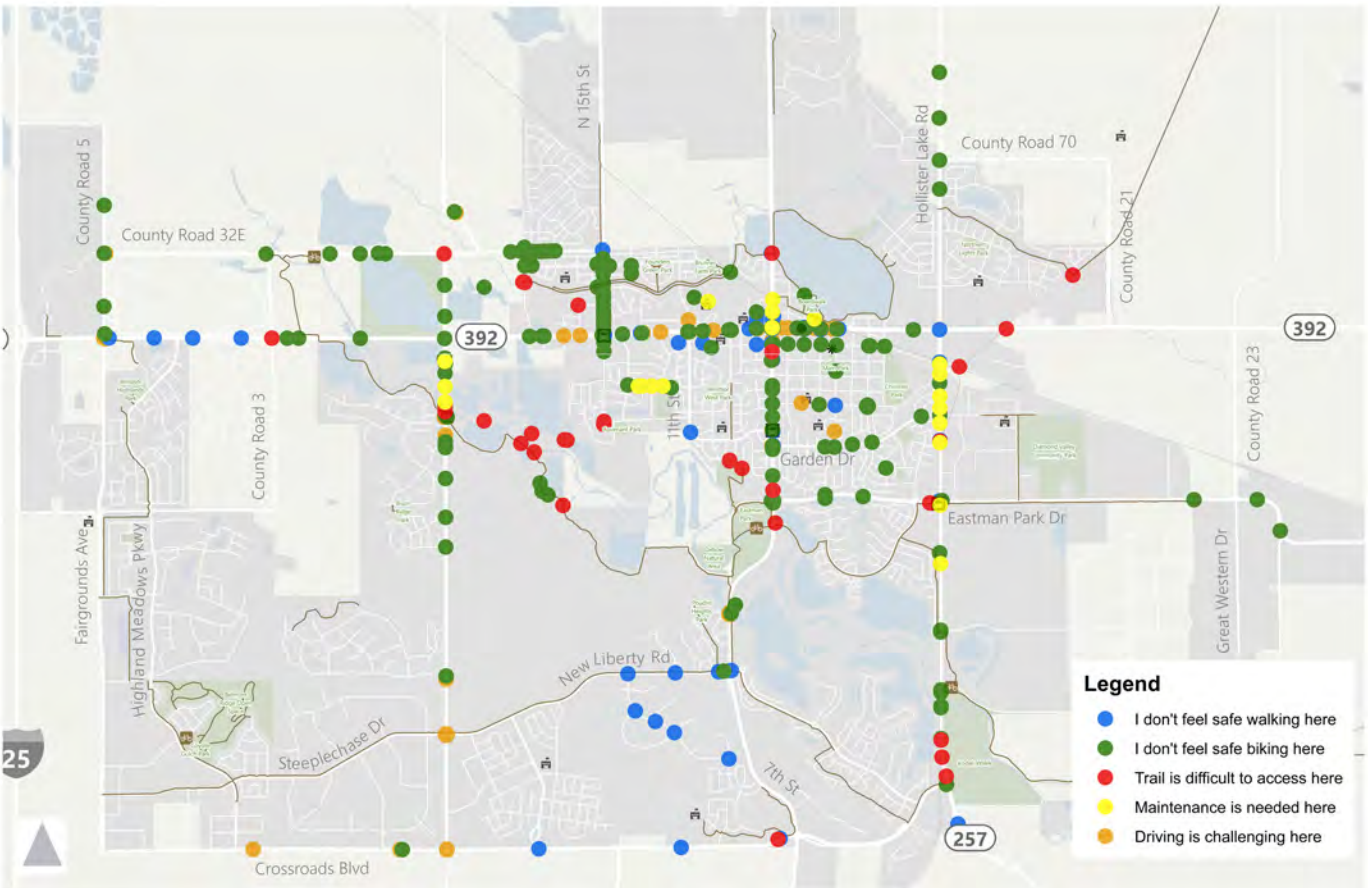
Figure 17: *Word cloud from the public and stakeholders on future vision for transportation in Windsor*

Across the various outreach efforts, there were collective themes that emerged, revealing the common transportation issues and opportunities that the community experiences in Windsor. The following list includes the most common themes that arose through the public outreach process:

- Truck traffic (particularly around Main Street)
- Pedestrian and bicycle crossings that feel unsafe
- Congestion
- High vehicle speeds (both posted speeds and speeding)
- Lack of access and connectivity to trails
- Desire for greater multimodal connectivity
- Driver infractions

In addition to qualitative themes, geographic themes also arose through the outreach process, with many people identifying the same hot spots where safety and comfort across modes could be improved. **Figure 18** displays the places people identified as challenging, with each mode of transportation displayed as a different color dot. This map reveals SH 392 (particularly downtown), 7th Street, North 15th Street, and WCR 13 as priority areas for improvement identified by people across different modes of transportation. Town Board and Planning Commission supported the themes heard by the public throughout the planning process, acknowledging the need for input from a diverse cross-section of the community.

Figure 18: *Results from the interactive map*



PHASE II

The second phase of outreach in late Fall 2019, presented the vision and goal statements as well as draft recommendations for multimodal projects and programs to the community. These outreach events also sought feedback from the public on draft recommendations and input on project prioritization.

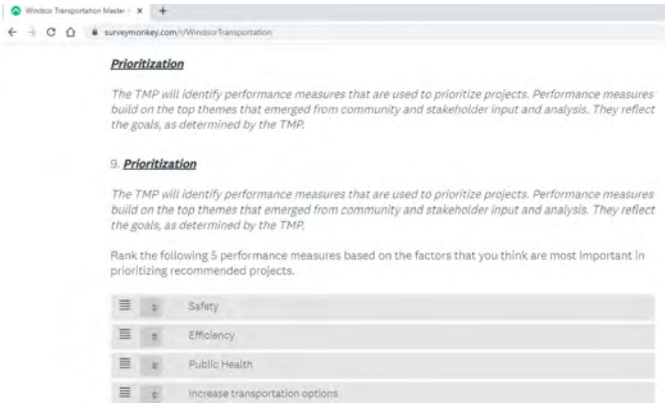
MEDIUMS FOR INPUT

Similar to Phase I, the second Phase of outreach solicited input from members of the community through a number of different mediums. These included:

- **Open house-** On the evening of December 5th, attendees of the public open house provided their feedback through interactive sticker dot voting, and voting on priorities with 'Windsor dollars.'

- **Intercept events-** For those that were unable to attend the open house, the project team went to the community and sought input at Windsor Wonderland, a well-attended winter event.

- **Online survey-** An online survey was also available that received input on reactions to the vision statement, anticipated behavior change, operational preferences and priorities.



Prioritization

The TMP will identify performance measures that are used to prioritize projects. Performance measures build on the top themes that emerged from community and stakeholder input and analysis. They reflect the goals, as determined by the TMP.

9. Prioritization

The TMP will identify performance measures that are used to prioritize projects. Performance measures build on the top themes that emerged from community and stakeholder input and analysis. They reflect the goals, as determined by the TMP.

Rank the following 5 performance measures based on the factors that you think are most important in prioritizing recommended projects.

Safety
Efficiency
Public Health
Increase transportation options

- **Social Media-** Information on the TMP was distributed widely via Facebook, Instagram and Twitter, with input gathered through social media comments.

- **Town Board, Planning Commission and Stakeholders-** Throughout the TMP process, draft information was presented for feedback to Town Board, Planning Commission and groups of stakeholders including neighboring jurisdictions and partner agencies.

WHAT WE HEARD

Results from Phase II of outreach showed a general support for the proposed recommendations. **Figure 19** shows that 95% of online survey respondents fully or mostly support the plan's vision statement. **Figure 20** shows that over half of respondents will bike more than they currently do with the implementation of the proposed low-stress bike network. Lastly, open house attendees and survey respondents identified which of the project's goals they thought was most important to informing project prioritization. The results, shown in **Figure 21**, reveal that safety followed by efficiency are most important to the community.

Town Board and Planning Commission supported the themes and recommendations heard by the community.

Figure 19: *Community support of the TMP vision statement*

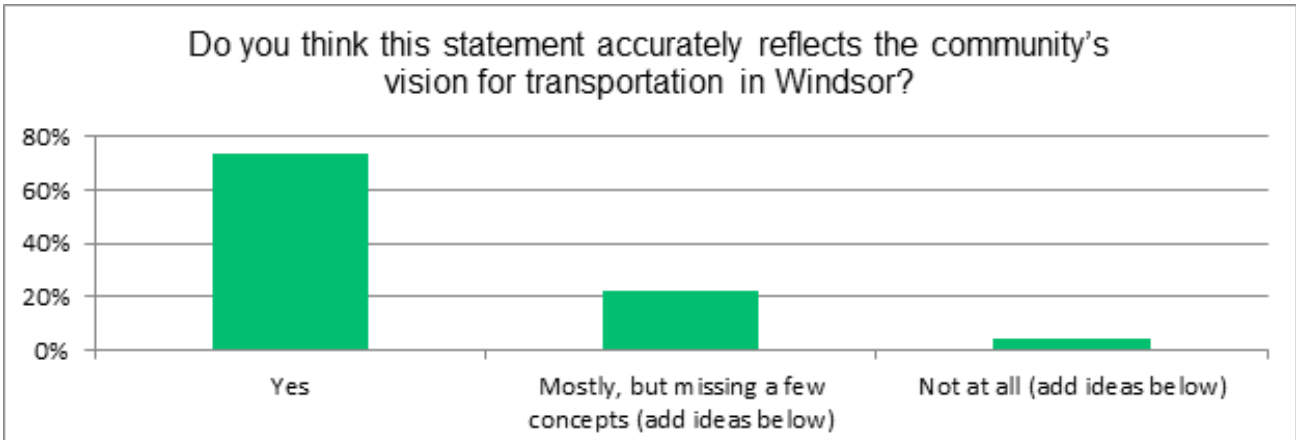


Figure 20: *Reaction to the proposed bike network*

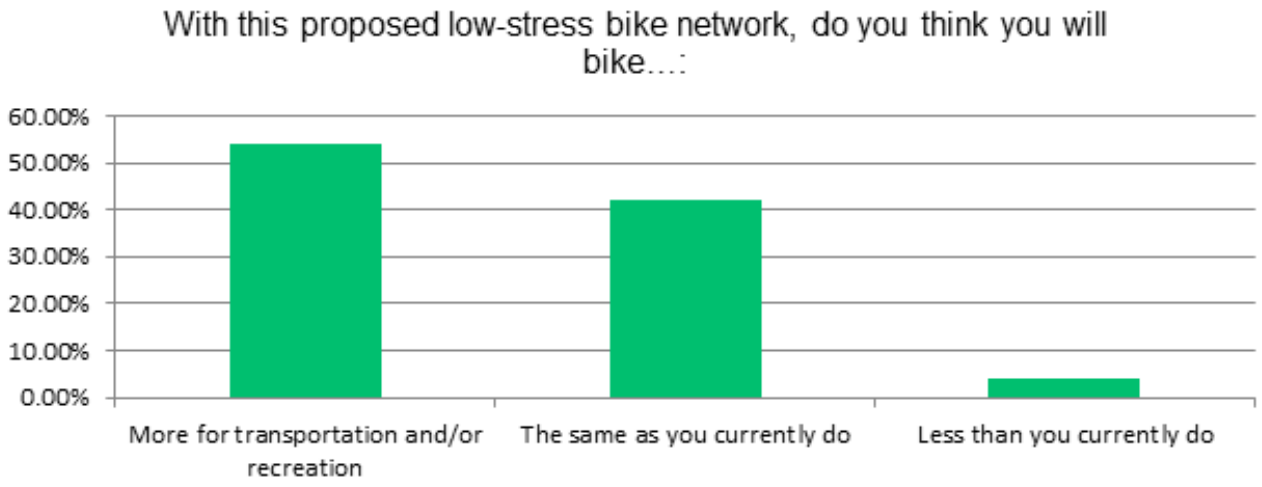
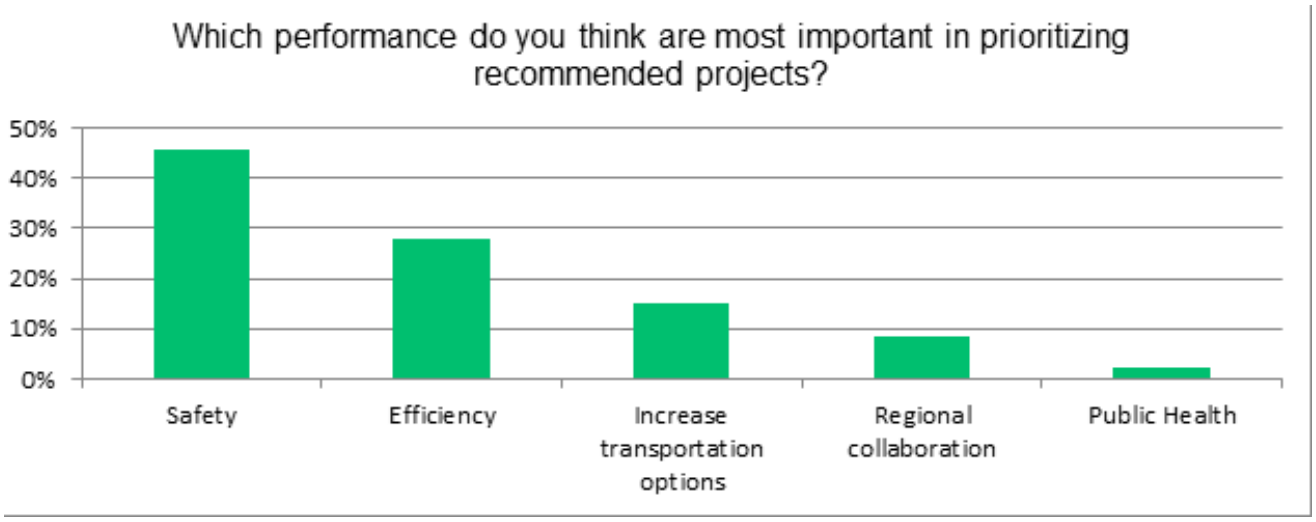


Figure 21: *Most important performance measures*



4 | Vision, Goals and Performance Measures

VISION, GOALS, AND PERFORMANCE MEASURES WERE DEVELOPED FOR TRANSPORTATION IN WINDSOR TO SERVE AS A GUIDE FOR FUTURE DECISIONS ABOUT PRIORITIES, INVESTMENTS, TRADEOFFS, AND PHASING.

In order to develop and finalize these statements, the project team built off the common themes heard from the public, stakeholders, and Town Board during the first phase of outreach in the Summer 2019. In addition, the drafting of goals considered the Colorado Department of Transportation (CDOT) and the North Front Range Municipal Planning Organization (NFRMPO) seven criteria used to select projects on the State system. **Figure 22** shows the six criteria selected by CDOT, with 'Readiness' added as a seventh by the NFRMPO. This process ensured that the performance measures identified by Windsor align with those used by CDOT and the NFRMPO, to facilitate grant applications and funding procedures. The Town's goals for transportation will inform project prioritization and decision making, thus alignment with regional, state and federal goals will set Windsor up for success in applying for funding moving forward. These concepts, in combination with priorities identified in previous planning efforts, were developed into a set of goals with corresponding performance measures.

Figure 22: *CDOT's six performance criteria*

Safety	Mobility	Economic Vitality	Asset Management	Strategic Nature	Regional Priority
Potential Criteria	***Potential Criteria***	***Potential Criteria***	***Potential Criteria***	***Potential Criteria***	***Potential Criteria***
Extent to which project addresses safety deficiencies at locations with known safety issues (as indicated by Level of Safety Service (LOSS) 3 or 4), or other known or projected safety issues	Extent to which project addresses a mobility need, including congestion reduction, improved reliability, new or improved connections, eliminations of "gaps" or continuity issues, new or improved multimodal facilities, improves efficiency through technology, or improved access to multimodal facilities	Extent to which a project supports the economic vitality of the state or region, including supporting freight, agricultural, or energy needs, or providing or improving access to recreation, tourism, military, job, or other significant activity centers	Extent to which project addresses asset life, including improving Low Drivability Life pavement or poor rated structures	Strategic nature of project, regional or statewide significance, leverages innovative financing and partnerships, and balances short term needs vs. long term trends.	Priority within the Region, based on planning partner input including priorities expressed in Regional Transportation Plans
TC Guiding Principle	***TC Guiding Principle***	***TC Guiding Principle***	***TC Guiding Principle***	***TC Guiding Principle***	***TC Guiding Principle***
Safety	**Mobility** **Programs and projects leveraging new technology development** **Integrated System Impacts and Benefits**	**Economic Impacts** **Statewide Equity**	**Asset Management / Preservation Benefits** **Impact of Asset Management decision on asset life and function**	**Financial Leverage, Financial Innovation, and Partnerships** **Short term projects vs. Accommodating Long-Term Projects trends** **How does the system look in 30 years and how does this project fit in?**	**Is the project informed by extensive collaborative work already done on Prop 110 project list and existing regional / local planning and what are the reasons for deviating from these?** **Regional flexibility / related smaller scale projects**

VISION

A vision statement thinks about the future and sets a standard to be pursued. Setting a vision for the future of transportation in Windsor is important to guide decisions, priorities and investments in order to effectively work towards a future that is in line with the community's values.

The vision statement for transportation in Windsor, as guided by the community and stakeholders, is: *Windsor's transportation system will serve all ages and abilities through a connected, multimodal network that is safe, equitable, efficient, comfortable, and intuitive.*

Windsor's transportation system will serve all ages and abilities through a connected, multimodal network that is safe, equitable, efficient, comfortable, and intuitive.

GOALS AND PERFORMANCE MEASURES

While the vision statement reflects the desired end result for the community, a **goal** defines the direction towards a destination, and alters the direction of transportation in Windsor toward the plan vision. The identified goals are an important guide in the TMP as they were used to inform the prioritization process. Each goal has a corresponding set of performance measures. **Performance measures** are listed for each goal and contain the measurable action items for completing the goal.

1. **SAFETY:** A **safe** multimodal transportation system that reduces stress, injury, and conflict

   a. Reduction in the annual crash rate (number of crashes/volume)

   b. Maintain zero fatal crashes on an annual basis

   c. Buildout the low-stress multimodal network

   d. Reduce conflicts from high crash rate intersections

2. **EFFICIENCY:** A multimodal network that **efficiently** moves people and goods

   a. Plan and build complete streets for all modes of travel

   b. Balance the needs of roadway users with Multimodal Level of Service (MMLOS)

   c. Designate corridors for freight and trucks

   d. Monitor changes in travel time on key corridors over time

   e. Monitor intersection and corridor volume/ capacity ratios over time

3. **PUBLIC HEALTH:** A multimodal transportation system that improves **public health, environmental sustainability,** and **quality of life** for everyone

   a. Build safer intersections to ensure safe walking and bicycling

   b. Design complete streets (i.e. low-stress bicycle and pedestrian facilities that meet national standards and best practices) that provide choices and options for walking/bicycling

   c. Prioritize infrastructure that makes biking and walking to school safer

4. **TRANSPORTATION OPTIONS:** A multimodal network of connected complete streets and routes that expands **transportation options** and contributes to economic vitality

   a. Remove the physical barriers in the network that result in discontinuous or high stress walking/ bicycling

   b. Integrate the on and off-street multimodal network

   c. Connect neighborhoods with multiple vehicular, walking and bicycling routes to adjacent areas, particularly activity centers

   d. Ensure that all residents live within a defined distance from a low-stress bicycle facility

5. **REGIONAL COLLABORATION:** A regionally connected multimodal network developed through **collaboration with regional partners**

   a. Jointly prioritize, plan and fund multimodal projects that connect Windsor to adjacent communities

b. Leverage local funding with regional partners' funding to construct regional transit projects

6. **MAINTENANCE:** Continued **maintenance** of transportation infrastructure to minimize capital costs

   a. Plan for multimodal infrastructure maintenance when constructing and financing new facilities

   b. Integrate multimodal infrastructure maintenance with ongoing pavement resurfacing projects

   c. Consider the extent to which a project considers asset life when prioritizing and implementing projects

7. **FISCAL-RESPONSIBILITY:** Transportation investments are cost-effective and **fiscally responsible for all modes of travel**

   a. Distribute annual capital fund expenditures to benefit all modes of travel

   b. Leverage regional partnerships and external funds to expand the multimodal network

   c. Prioritize multimodal improvements in high crash and high stress locations

   d. Prioritize projects that can be implemented quickly or phased

5 | Pedestrian and Bicycle Networks

THIS CHAPTER IDENTIFIES THE NEEDS AND RECOMMENDATIONS TO IMPROVE THE WALKING AND BIKING EXPERIENCE IN THE TOWN OF WINDSOR.

PEDESTRIAN NETWORK

The pedestrian realm consists of sidewalks, multi-use trails, and crossings. The Town has an extensive existing network of trails. However, trails often require out of direction travel and/or do not provide direct access to or from a user's destination. Therefore, a complete sidewalk network is an important supplement to the trail network to allow for walking as a means of transportation and to provide access where trails are not present.

The TMP proposes a Pedestrian Program with dedicated funding that will build out Windsor's pedestrian network between now and 2040. The Pedestrian Program consists of the completion of sidewalk gaps; rehabilitation of existing substandard sidewalks, crossings and curb ramps; and implementation of new enhanced crossings.

This section describes the proposed infrastructure improvements; **page 103** of **Chapter 11** describes the annual dedicated funding for the Pedestrian Program.

PEDESTRIAN PROGRAM

The Pedestrian Program consists of completion of pedestrian network gaps and rehabilitation of the existing network.

Gaps in the pedestrian network are locations where there is a roadway but not an adjacent sidewalk (if required per Windsor standards shown in **Figure 23**). Existing sidewalk gaps are shown in **Figure 24**; this is a quickly evolving data source and is not comprehensive or up to date to 2020 conditions.

The *rehabilitation of the existing pedestrian network* describes locations where there is a sidewalk/crossing/curb ramp present, but that sidewalk does not meet standards. **Figure 23** shows the minimum design standards for sidewalk width and buffer presence based on Windsor's Design Criteria and Construction Specifications (last revised July 22, 2019). As show in this map, 5' attached sidewalks are required on Urban Local Residential Streets and Urban Local Industrial Streets. Rural Streets and Urban Local Commercial and Urban Minor Collector streets are required to have 5' detached sidewalks. All Urban Arterials are required to be 6' detached sidewalks, with a buffer at least 9.5' wide. Windsor does not currently have an inventory of sidewalk quality, width or buffer presence.

The TMP recommends a details inventory of the presence and quality of all existing sidewalks, crossings, and curb ramps.

Rehabilitation includes:

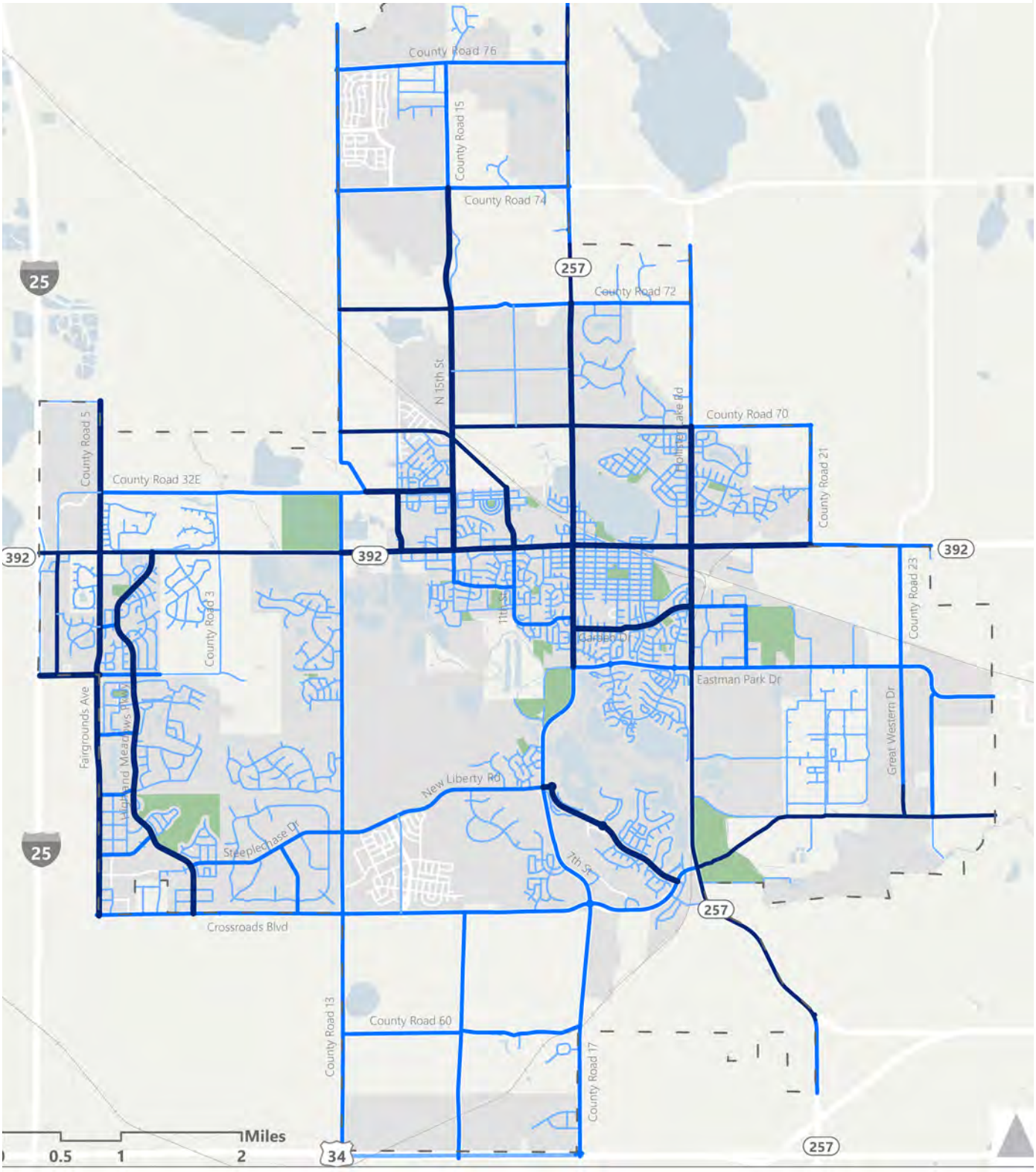
- replacement of damaged sidewalk
- widening of substandard width sidewalks
- upgrade of curb ramps to meet ADA standards
- crossing improvements

The TMP identifies a prioritized approach to complete the pedestrian network through gap completion and rehabilitation to meet standards. Tier 1 locations are areas that are ¼ mile around schools and high crash locations. Tier 2 locations are ¼ mile around parks and multi-use trail access points. These tiers are also shown in **Figure 24**.

Prioritization of completing the pedestrian network will consist of the following components, in the order listed:

1. Pedestrian network completion in Tier 1 locations
2. Pedestrian network rehabilitation in Tier 1 locations
3. Pedestrian network completion in Tier 2 locations
4. Pedestrian network rehabilitation in Tier 2 locations
5. Pedestrian network completion in all other locations
6. Pedestrian network rehabilitation in all other locations

Figure 23: *Sidewalk design standards by street classification*



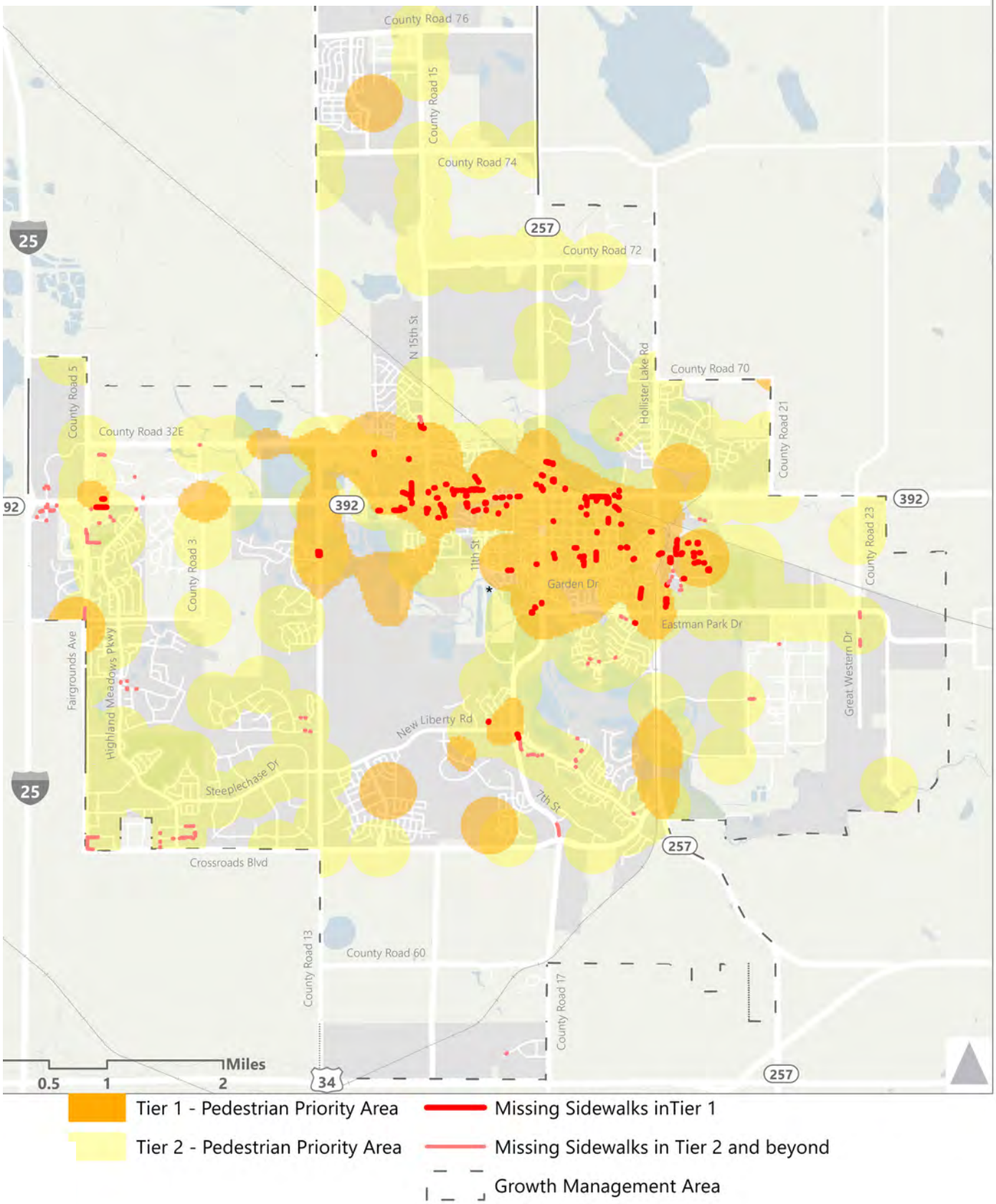
5 ft Attached

5 ft Detached

6 ft Detached

Growth Management Area

Figure 24: *Tiered areas for pedestrian network completion*



CROSSINGS

In December 2018, the Town of Windsor published the *Pedestrian Crossing Guidelines* to provide a set of criteria, procedures, and policies to guide the installation of pedestrian crossing treatments on Windsor's roadways. This document summarizes: criteria for pedestrian crossing; procedures for evaluating the need for crossing treatments; and types of crossing treatments that may be applicable for a particular set of pedestrian volumes, pedestrian types, vehicular volumes, vehicular speeds, and roadway geometry.

The Town should implement an average of three new uncontrolled pedestrian crossings a year in order to complete the crossing component of the pedestrian network by 2040.

Providing safe and frequent crossings is an important component of a complete pedestrian network. Prior to the adoption of the TMP, the Town implemented three RRFBs a year; this recommendation consists of the continuation of two RRFBs a year with the addition of one additional uncontrolled crossing. Both proactive and reactive approaches are needed to develop a comprehensive pedestrian crosswalk safety strategy. Town staff can use the *Town of Windsor Pedestrian Crossing Guidelines* both to reactively address locations (in response to a community request for a crosswalk or pedestrian safety countermeasures) and to proactively address locations (in conjunction with a study, development, or other city capital/ maintenance project) where an enhanced pedestrian crossing should be considered for implementation.

Reactively Addressing Locations

To address locations where the community has expressed a desire for a crosswalk, refer to the *Pedestrian Crossing Guidelines* to determine if a crosswalk is merited and what the treatment should be.

Proactively Addressing Locations

Figure 24 prioritizes sidewalks and areas where Town staff will proactively investigate crossing locations, first in Tier 1 locations, then Tier 2 locations, followed by all other locations. Proactive approaches to investigating crossings in Tier 1 locations could include holistic assessments, walk audits, and systemic safety analyses to address potential safety issues that may not be evident in reported crash records or specific requests from the community. Once crossing locations are identified, each crossing should be assigned a score based on the peak hour pedestrian crossing volume and the corresponding conflicting vehicular volume, divided by the project's cost. Locations with the highest score should be prioritized for implementation.

Score = (Pedestrian volume x Vehicle volume) / Project cost

Per the recommendation in **Chapter 8** on safety, Windsor should implement an Annual Road Safety

Program to identify priority safety improvement projects based on high-risk roadway features correlated with particular severe crash types. This systemic safety approach goes beyond spot treatments where previous crashes have occurred by identifying locations that have the highest potential for severe crashes in the future.

BICYCLE NETWORK

The low-stress bike network, developed as a part of the TMP, recommends a connected and comprehensive network of bike facilities that are generally comfortable for bicyclists of all ages and abilities.

The Level of Traffic Stress (LTS) methodology (Mekuria, Furth, Nixon, 2012) was applied to determine what bike facility type is appropriate based on the adjacent street characteristics LTS is a scoring system used to classify the comfort of specific bicycle facilities. Scoring is from LTS 1 to LTS 4, with LTS 1 being comfortable, "low-stress" bicycle environments for those ages 8 to 80, and LTS 4 being places where biking is very uncomfortable or even impossible, with limited or no accommodations for pedestrians or bicyclists. LTS 1 and 2 are considered low-stress facilities, while LTS 3 and 4 are considered high-stress; therefore, only bike facilities that qualify as LTS 1 or 2 were recommended as a part of the bike network. **Figure 25** and **Figure 26** display the breakdown of bicycle rider types by LTS.

Mekuria, Furth, and Nixon's development of the original Level of Traffic Stress (2012) provided a framework that was adapted for Windsor. Guidance from the National Association City of Transportation Officials (NACTO) and American Association of State Highway and Transportation Officials (AASHTO) was also used to determine the appropriate facility type based on street characteristics.

Figure 25: *Bicycle Level of Traffic Stress (LTS) Scores*

Figure 26: *Bicycle Rider Types*

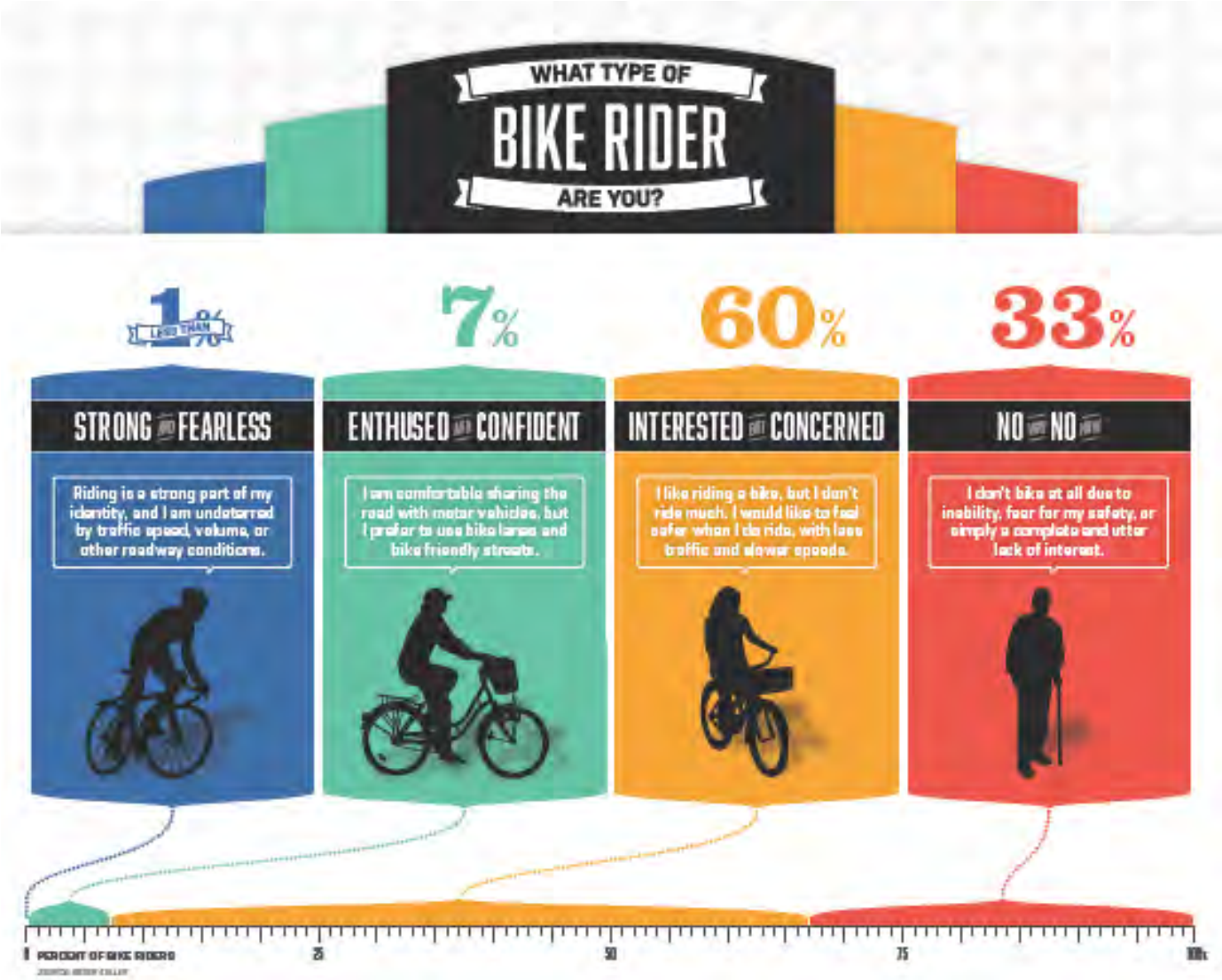
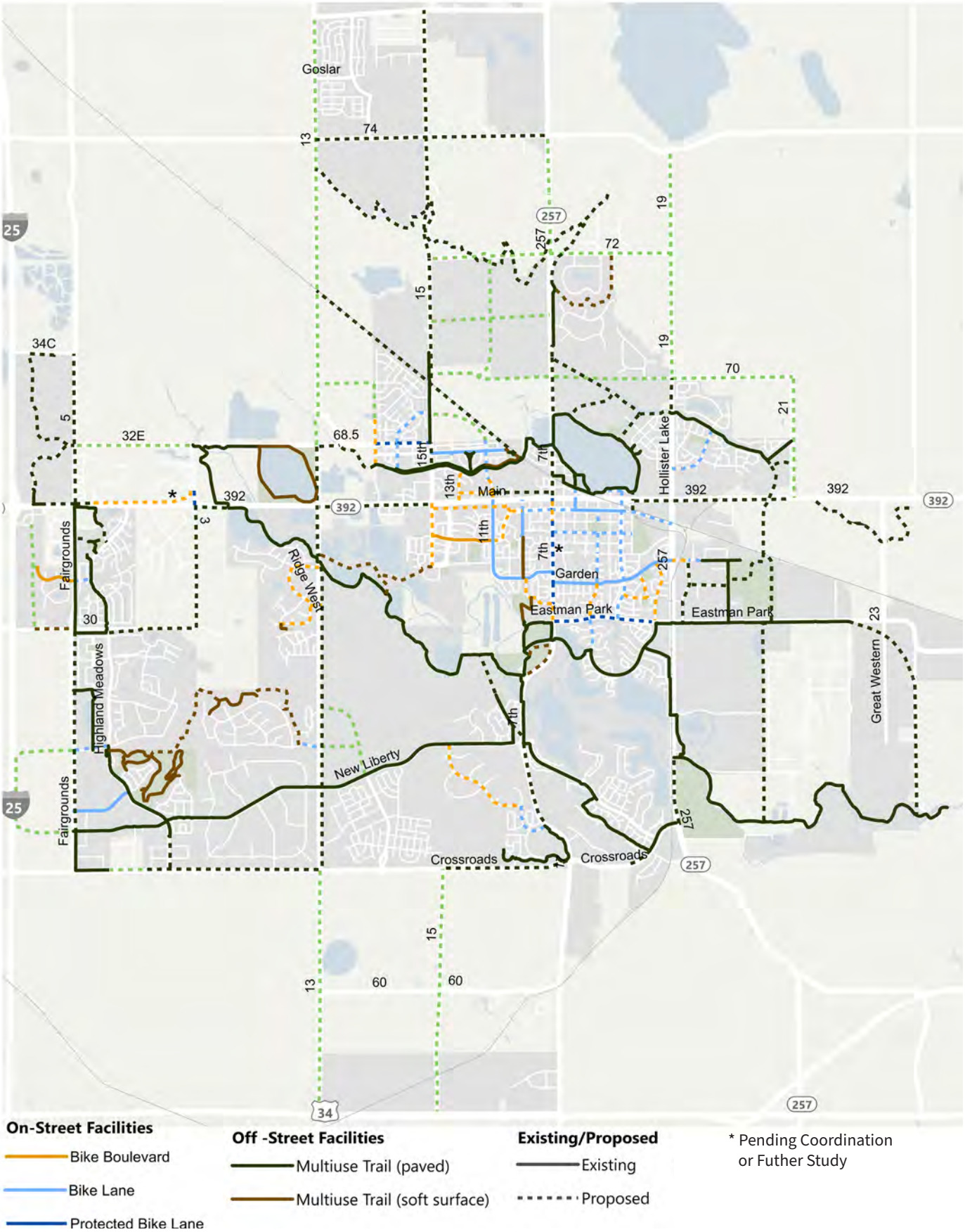


Figure 27 shows the map of the bike network, including both existing and proposed facilities. The map shows the different bike facility types for each corridor. Bike facility types are defined further in the following section.

Figure 27: *Low-stress bicycle network*



BICYCLE FACILITY GLOSSARY

This section defines and describes characteristics of the proposed bicycle facility types. Bike boulevards and protected bike lanes do not currently exist in Windsor; as new facility types, appropriately defining these facilities is key for successful implementation. Detailed drawings showing specific recommended dimensions for facility types are included in **Appendix C**.

BIKE BOULEVARD

Bike boulevards are streets with low vehicle volumes and speeds where people biking share the travel lane with people driving. Bike boulevards use signs, pavement markings, and speed and volume management to communicate the presence and prioritization of people biking. These streets are local roads that are generally not efficient for vehicle through travel. Bike boulevards should include wayfinding signage with distance, direction, and destination information.

Because the current posted speed limit on local streets (30 mph) is too high according to the Level of Traffic Stress methodology to be considered low-stress as a shared roadway, the posted speed limit for bike boulevards will be reduced from 30 mph to 25 mph. This speed limit reduction will be accompanied by traffic calming features that control volume or speed through vertical deflection (bollards) and horizontal deflection (bulb outs, chicanes, medians). The *US Traffic Calming Manual* (Ewing, Reid, & Steven Brown) includes the efficacy for various treatments and can be used to identify the appropriate treatment type for each corridor. A study of each recommended bike boulevard should be completed to plan and design the appropriate traffic calming treatments for the characteristics of that specific corridor.

BIKE LANE

A bike lane is a designated space for bicyclists, separated from the general-purpose travel lane or parking lane by a single white line. Bike lanes should be six feet wide, with a minimum of four feet of usable width, not including curb and gutter on constrained corridors. Bike lanes adjacent to on-street parking should be 6.5 feet to account for the door zone. Bike lanes have been recommended on streets with additional right of way that can accommodate the addition of a bike lane without removal of a travel lane and minimal removal of on-street parking, except where underutilized and with off-street parking alternatives. Bike lanes are appropriate on corridors with posted speed limits less than 25 mph and two lane roadways (roadways can be four lanes only if they have a center median greater than eight feet wide).

PROTECTED BIKE LANE

Primarily intended for streets with higher average daily vehicle traffic and vehicle speeds, this treatment places vertical elements such as plastic bollards in the buffer area of a bike lane to further separate bike lanes from motor vehicle traffic, providing additional comfort and safety to cyclists. The bike lane component of the protected bike lane should be between five and seven feet wide, with a minimum buffer of three feet between the bike lane and travel lane (or on-street parking). Protected bike lanes have been recommended on streets with additional right of way that can accommodate the addition of a bike lane without removal of a travel lane and minimal removal of on-street parking, except where underutilized and with off-street parking alternatives.

MULTI-USE TRAIL (PAVED AND SOFT SURFACE)

Multi-use trails provide low-stress environments for bicycling and walking that are entirely separated from motor vehicle traffic. Windsor's network of multi-use trails serves as the arterials of the bicycle and pedestrian transportation system and an extension of on-street facilities. Trails should be a minimum width of eight feet and have a width of 12 feet where feasible. There should be at least a two-foot buffer between the trail and roadway.

BICYCLE CROSSING TREATMENTS

When creating a low-stress bike network, it is paramount to consider where bicycle facilities cross roads at intersections or at midblock designated crossings. The weakest link approach acknowledges that a low-stress bicycle facility is only as comfortable as the lowest comfort component; this component is often the intersection. An effective bicycle facility crossing applies design strategies and tools at the intersection to reduce the conflict between vehicles and people on bikes by targeting three key elements:

1. Reduce vehicle turning speeds
2. Increase the visibility of bicyclists
3. Give priority to bicyclists

The characteristics of the roadway being crossed and the bicycle facility type influence what crossing treatment is necessary. There are four main types of bicycle crossing treatments. These treatments are applied to any permutation of bike facility type and street classification:

1. Protected intersections
2. Dedicated intersections
3. Minor street crossings
4. Roundabout

Table 3 shows what category of crossing treatment is most appropriate for each facility type and street type. Detailed drawings showing specific recommended dimensions for facility types are included in **Appendix C**.

The TMP recommends that appropriate crossing treatment types are studied, planned for and designed as a part of the implementation of bicycle facilities.

Table 3: *Bicycle crossing treatment identification*

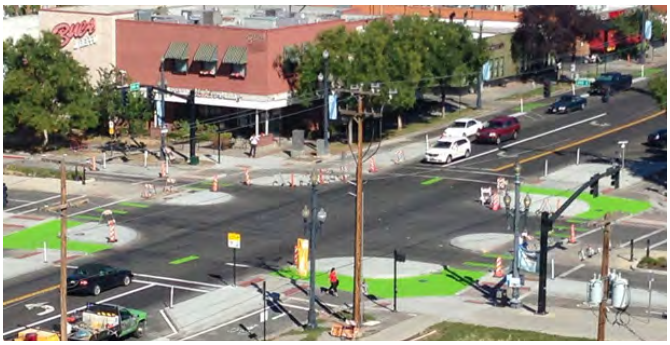
INTERSECTION CATEGORY: STREET CLASSIFICATION OF THE PERPENDICULAR STREET, BEING CROSSED BY BICYCLISTS					
BICYCLE FACILITY TYPE	**LOCAL**	**COLLECTOR**	**ARTERIAL**	**DRIVEWAY**	**ROUNDABOUT**
Bike Boulevard	Minor Street Crossing	Dedicated Intersection	Dedicated Intersection	Minor Street Crossing	Merged with Traffic
Bike Lane	Minor Street Crossing	Dedicated Intersection	Dedicated Intersection	Minor Street Crossing	
Protected Bike Lane	Dedicated Intersection	Protected Intersection	Protected Intersection	Minor Street Crossing	Provide Ramps to Pedestrian or Otherwise Separated Infrastructure
Trail	Minor Street Crossing	Dedicated Intersection	Dedicated Intersection	Minor Street Crossing	

PROTECTED INTERSECTIONS

Protected intersections are recommended where protected bike lanes meet collectors and arterials, as shown in **Figure 28**.

According to NACTO:
"Protected intersections can be applied on any street where enhanced bike comfort is desirable. They are most commonly found on streets with parking-protected bike lanes or buffered bike lanes. Protected intersections can also be implemented using interim materials. Where no parking lane exists, a setback can be created by shifting the bikeway or motor vehicle lanes away from one another as they approach the intersection."

Figure 28: *Protected intersection (Source: NHPR)*



DEDICATED INTERSECTIONS

Dedicated intersections are recommended when bike boulevards, bike lanes, and trails meet collectors and arterials and where protected bike lanes meet local streets. An example of a dedicated intersection is shown in **Figure 29**.

According to NACTO:
"Dedicated intersection geometry should be considered where there is not enough space to set back the bikeway from mixed traffic at the intersection. This condition often arises when a protected bike lane runs close to mixed traffic lanes without a parking or loading lane between them."

Figure 29: *Dedicated intersection*

MINOR STREET CROSSINGS

Minor street crossings are recommended when bike boulevards, bike lanes, or trails cross local roads or driveways (with the exception of protected intersection treatments for some protected bike lanes). An example of a minor street crossing is shown in **Figure 30**.

According to NACTO:
"Minor street crossings use compact corners and raised elements to keep turn speeds low. The raised crosswalk and bikeway indicate to drivers that they are entering a low-speed environment, and must prepare to yield to other users. Traffic control devices, such as signals, are uncommon. Ensuring a clear approach sightline is essential to encourage drivers to yield to people in the bikeway or the crosswalk. Raised bikeway crossings should be considered where bikeways cross minor streets, neighborhood streets, driveways, and other small streets. Where the bikeway is not signalized, such as at uncontrolled or stop-on-minor intersections, the raised crossing provides unambiguous priority to bikes in the intersection."

ROUNDABOUTS

When bike facilities meet a single lane roundabout with a designated speed of <15 mph, bike boulevards and bike lanes can merge with traffic. Additional signage should also be provided, as well as on-street painted arrows.

When a protected bike lane or trail meets a roundabout, or when any bicycle facility meets a two-lane roundabout, separated facilities for bicyclists (perhaps shared with pedestrian infrastructure and with pedestrian crossings) should be clearly marked. This infrastructure should have ramps and clear crossing markings for where bikes are to cross the legs of the roundabout. An example is shown in **Figure 31**.

Figure 30: *Minor street crossing*

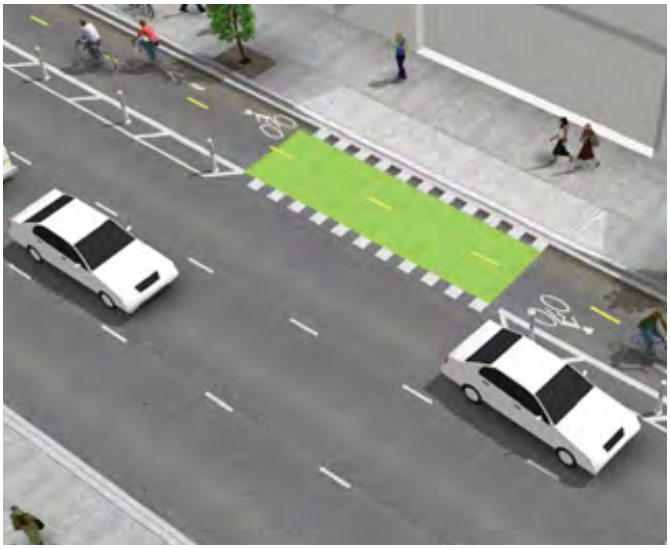
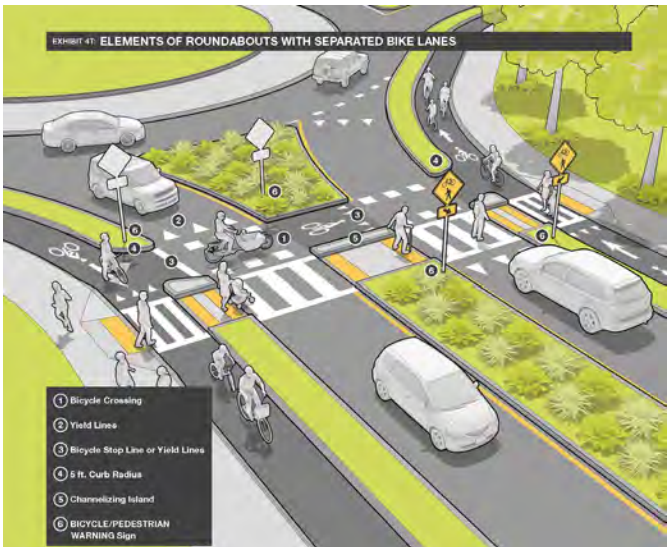


Figure 31: *Bicycle facility at a roundabout (MassDOT)*



TREATMENTS

For each of the intersection types discussed, there are certain treatments that are most appropriate.

Recessed stop bar

Installing recessed stop bars for vehicles at intersections increases the visibility of bicyclists and can be applied across all controlled intersection treatment strategies. **Figure 32** shows a recessed vehicle stop bar. This can also take the form of a bicycle box, which is a designated area in front of the travel lane at a signalized intersection that is safe and visible for bicyclists to wait. This allows cyclists to get ahead of queueing traffic during the red signal phase. An example is shown in **Figure 33**.

Figure 32: *Recessed vehicle stop bar*

Figure 33: *Bike box*

Signal phasing strategy

At signalized intersections, there are several strategies related to signal phasing to enhance bicycle safety, visibility, and prioritization. They are:

1. Leading Bike Interval (LBI) and Lagging Left Turn- An LBI is where the bicyclists receives a green a few seconds in advance of vehicles, allowing the bikes to get a head start into the intersection to become visible. A lagging left turn provides the vehicle with a left turn green arrow after the through movement, to allow bicyclists to pass through the intersection first.
2. Bike Signal (**Figure 34**)- A bike signal provides the bicyclist with a separate phasing from vehicles. This may be in the form of protected or permissive left turns, or through movements.

According to NACTO: *A LBI can be provided if a shared through/turn lane is next to the bikeway. If a dedicated right or left turn lane is next to the bikeway, protected-permissive bike signal phasing should be considered. Protected signal phases should be considered if turn volumes from the adjacent lane exceed 120 to 150 vehicles per hour (vph). Protected signal phases should also be considered if conflicting left turn volumes (on two-way streets) across the bikeway exceed 60 to 90 vph, or if these turns cross multiple traffic lanes."*

Figure 34: *Bicycle signal*

Intersection Crossing Markings

NACTO recommends the implementation of crossbike across the intersection; a crossbike is similar to a crosswalk but for bikes—intersection crossing markings for bikes. This can consist of bike lane line extensions with broken white lines and/or dashed green bars. Examples of crossbike are shown in **Figure 35** and **Figure 36**.

Figure 35: *Intersections crossing example*

Figure 36: *Sharrow crossing marking example*

Channelized Right Turn

Channelized right turns provide a refuge for pedestrian crossing multi-lane arterials. They also increase the visibility of pedestrians by adjusting the sight line of drivers. When implementing a bicycle facility along or perpendicular to a channelized right turn, it is important to highlight areas of conflict or mixing zones with skip striping and green paint. **Figure 37** and **Figure 38** show examples of bicycle facilities with channelized right turns.

Figure 37: *Channelized right turn with bike facility*

Figure 38: *Channelized right turn with bike facility*

BICYCLE WAYFINDING PROGRAM

In order to increase the intuitiveness of the bicycle network, Windsor should implement a bicycle wayfinding program. This program should include the creation of a branding, guidelines and standards that inform the design and placement of wayfinding signage.

A bicycle wayfinding program guides the development and implementation of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. Signs should include the indication of a bike route, nearby key destinations, and the distance to those destinations. The branding should be tied to the Town's branding but with a consistency that is unique to the bicycle network.

Wayfinding signs should be located at decision points along bicycle routes – typically at the intersection of two or more designated bicycle facilities and at other key locations leading to and along bicycle routes. The first step to develop this program is to develop a list of key destinations and classify destinations in a hierarchy based on their importance to Windsor. This list will then inform a prioritized list of locations for the implementation of signs to inform a phased implementation plan.

Examples of signage are shown in **Figure 39** and **Figure 40.**

Figure 39: *Bicycle wayfinding (Provincetown)*

Figure 40: *Bicycle wayfinding (Berkeley)*

6 | Transit

CONCURRENT WITH THE DRAFTING OF THE TMP, GREELEY EVANS TRANSIT (GET) FINALIZED THE COORDINATION OF THE POUDRE EXPRESS REGIONAL TRANSIT ROUTE TO CONNECT FORT COLLINS AND GREELEY, TRAVELING THROUGH WINDSOR.

GREELEY EVANS TRANSIT (GET) FORT COLLINS TO GREELEY REGIONAL TRANSIT

This service launched January 2, 2020, with three eastbound and westbound stops in Windsor—

1. Eastman Park Drive and Cornerstone Drive
2. 7th Street and Garden Drive
3. Main Street (Hwy 392) and 15th Street

A fourth stop at SH 392 and LCR 5 will be considered during a second phase. The bus operates Monday through Friday, with four-morning routes and three-afternoon routes traveling in each direction. **Figure 41** shows the map and schedule of the route. A one-way fare is $1.50 and free for university students.

As the only public transit available in Windsor, this route will provide an important regional connection for Windsor residents and employees traveling to Fort Collins or Greeley. It will provide a reliable and convenient alternative to driving that is in line with the community's sustainability and public health goals.

Given that GET regional transit is the first public transit option available in Windsor, it is important to educate residents and employees about the presence and value of the transit service. Messaging to both potential users and non-users can build community-wide support for a range of multimodal investments. As Windsor grows and diversifies, providing a range of transportation options creates a foundation for Windsor to grow and thrive.

Recommendations for information sharing and messaging include:

- Implementation of transportation demand management (TDM) strategies, as outlined in **Chapter 9**. TDM strategies will provide opportunities to educate potential users on available transportation options and incentivize sustainable and healthy options.
- Messaging to non-users that explains the value of fostering a mobility landscape that supports multimodal options to give all residents and employees transportation options.
- Understanding that travel habits take time to shift and continue these efforts over time, even after the initial launch of the service.
- Diversification of outreach methods and education, understanding that users absorb information in different ways and through a range of mediums.

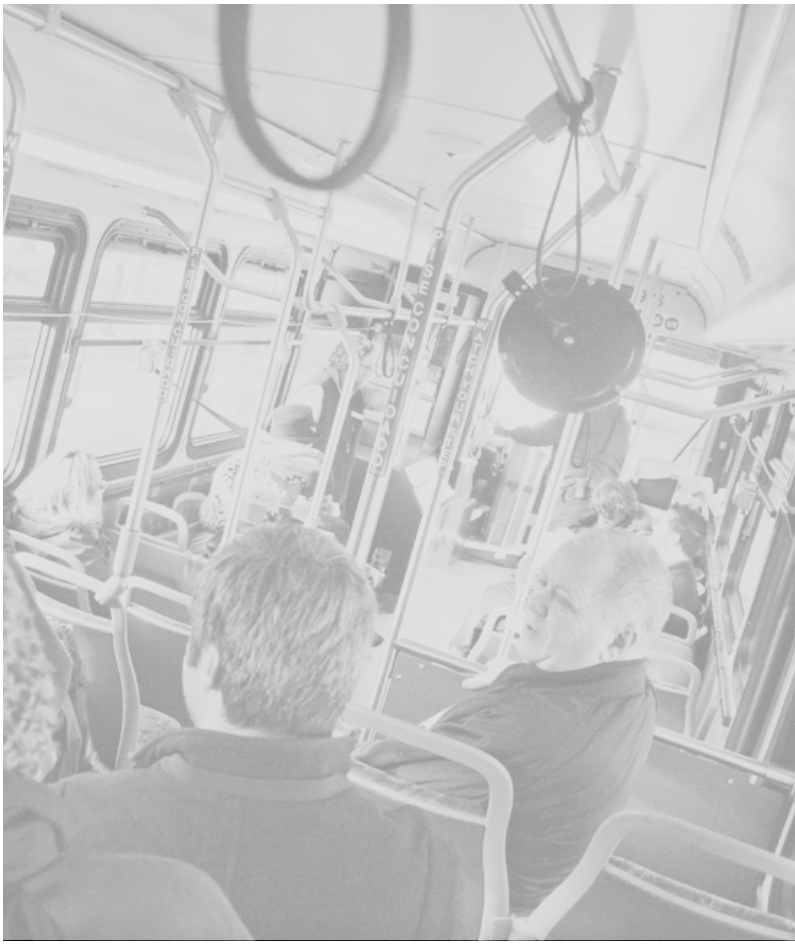
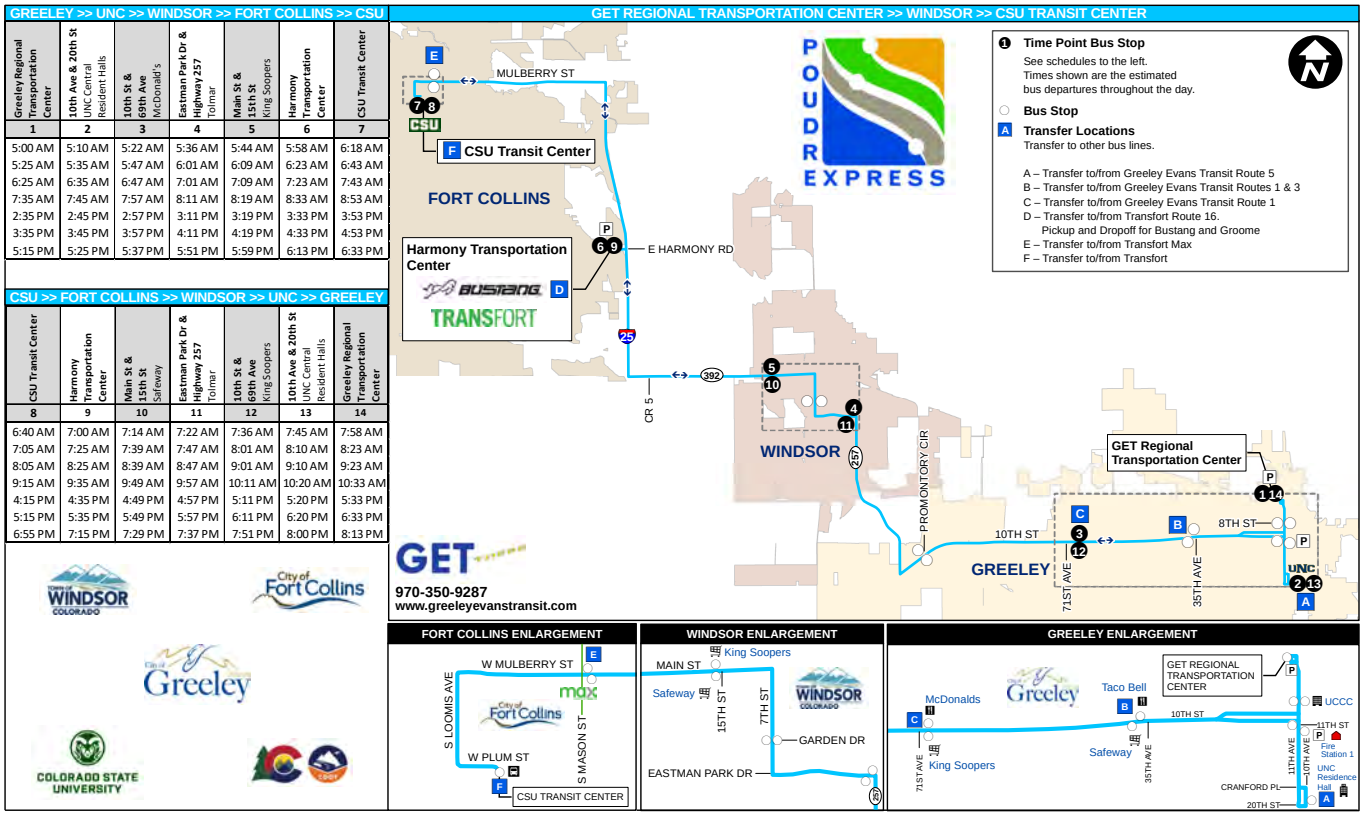


Figure 41: *GET Fort Collins to Greeley regional transit map and schedule*



GREELEY >> UNC >> WINDSOR >> FORT COLLINS >> CSU

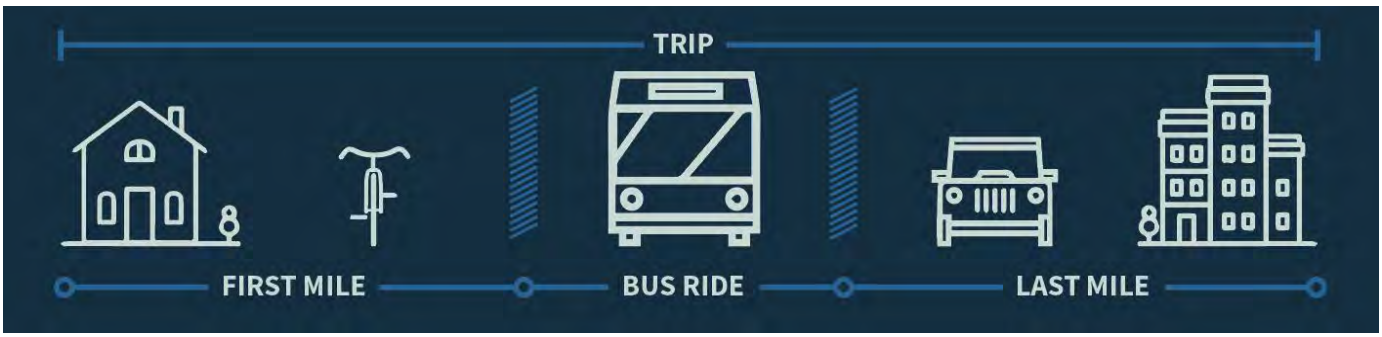
Greeley Regional Transportation Center	10th Ave & 20th St UNC Central Resident Halls	10th St & 69th Ave McDonald's	Eastman Park Dr & Highway 257 Tolmar	Main St & 15th St King Soopers	Harmony Transportation Center	CSU Transit Center
1	2	3	4	5	6	7
5:00 AM	5:10 AM	5:22 AM	5:36 AM	5:44 AM	5:58 AM	6:18 AM
5:25 AM	5:35 AM	5:47 AM	6:01 AM	6:09 AM	6:23 AM	6:43 AM
6:25 AM	6:35 AM	6:47 AM	7:01 AM	7:09 AM	7:23 AM	7:43 AM
7:35 AM	7:45 AM	7:57 AM	8:11 AM	8:19 AM	8:33 AM	8:53 AM
2:35 PM	2:45 PM	2:57 PM	3:11 PM	3:19 PM	3:33 PM	3:53 PM
3:35 PM	3:45 PM	3:57 PM	4:11 PM	4:19 PM	4:33 PM	4:53 PM
5:15 PM	5:25 PM	5:37 PM	5:51 PM	5:59 PM	6:13 PM	6:33 PM

CSU >> FORT COLLINS >> WINDSOR >> UNC >> GREELEY

CSU Transit Center	Harmony Transportation Center	Main St & 15th St Safeway	Eastman Park Dr & Highway 257 Tolmar	10th St & 69th Ave King Soopers	10th Ave & 20th St UNC Central Resident Halls	Greeley Regional Transportation Center
8	9	10	11	12	13	14
6:40 AM	7:00 AM	7:14 AM	7:22 AM	7:36 AM	7:45 AM	7:58 AM
7:05 AM	7:25 AM	7:39 AM	7:47 AM	8:01 AM	8:10 AM	8:23 AM
8:05 AM	8:25 AM	8:39 AM	8:47 AM	9:01 AM	9:10 AM	9:23 AM
9:15 AM	9:35 AM	9:49 AM	9:57 AM	10:11 AM	10:20 AM	10:33 AM
4:15 PM	4:35 PM	4:49 PM	4:57 PM	5:11 PM	5:20 PM	5:33 PM
5:15 PM	5:35 PM	5:49 PM	5:57 PM	6:11 PM	6:20 PM	6:33 PM
6:55 PM	7:15 PM	7:29 PM	7:37 PM	7:51 PM	8:00 PM	8:13 PM

FIRST/LAST MILE GAP

In order for the Fort Collins-Greeley regional transit route to be most effective, it is important to overcome the first/last mile gap in order to seamlessly connect users to bus stops. The *first/last mile gap* is the barrier that discourages potential riders from using transit because a stop cannot be easily accessed from home, work, or other destinations. This gap can include geography, topography, infrastructure, street design, or a lack of available transportation services. Because of Windsor's low density land use pattern and discontinuous street grid, this is an anticipated challenge.



First/last mile solutions provide not only increased access to transit, but improved connectivity, safety, and transportation options to all travelers. Given the varying land use contexts of each GET Transit bus stop as well as a range of user types, a spectrum of first/last mile options should be available. The TMP makes first/last mile recommendations that fall under four categories:

1. Bicycle and pedestrian infrastructure
2. Transportation demand management strategies
3. On-demand transportation services
4. Bike share and other shared mobility devices

BICYCLE AND PEDESTRIAN INFRASTRUCTURE

Upgrading multimodal access will allow more users to connect with GET Transit services through non-motorized modes. Recommendations for bicycle and pedestrian infrastructure in Chapter 5 were prioritized near transit stops.

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

Transportation demand management (TDM) is defined and recommended in detail in **Chapter 9**. These strategies also cover a wide range of approaches to improving access to transit from dispersal of information to fare assistance to trip planning apps.

BIKE SHARE AND OTHER SHARED MOBILITY DEVICES

Today, there is a large array of "micromobility" services available. Micromobility refers to small personal mobility devices (<1,000 pounds) including bicycles and scooters. These micromobility devices are often administered as shared devices that are available for rent on-demand; they are generally reserved through a smartphone app and are often administered by private companies. As part of the TMP, a review of recent developments in micromobility was conducted. **Chapter 10** provides a detailed description of the different platforms that are available and discusses the potential opportunities for each one in Windsor.

ON-DEMAND TRANSPORTATION SERVICES

On-demand transportation services, or ride-hailing, is the modern version of a taxi using a web-based platform that matches passengers with drivers in a simpler and more intuitive way. Ride-hailing can serve as an effective transportation option for providing first/last mile access when the total trip distance is long, thus making ride-hailing for the entirety of the trip a costly option. In Windsor where regional transit service is available and affordable, a short ride hailing trip from a user's house to the bus stop will make transit an accessible option. ; Compared to a local fixed route transit option, on-demand service optimizes resources by providing trips only when there is demand and providing the ability to share trips while still allowing door to door service.

An on-demand first/last mile service would provide transportation where one end of the trip is within a pre-defined boundary (Town boundary) and the other end is at a designated bus stop or transfer station.

This service would extend the reach of the existing fixed route service by providing users with a reliable transportation option that can seamlessly provide access to and from fixed route stops. The

TMP recommends further exploring the feasibility and support of a six-month long pilot of an on-demand service and evaluating its success before implementing this service more permanently. The operational characteristics of this program are further defined later in this section on the next page.

BUS STOP AMENITIES

Amenities at bus stops are an important component of providing a high-quality experience for transit users. During a meeting with Windsor Town staff, neighboring jurisdictions, and partner agencies in September 2019, 75% of attendees said

the Town should invest in significant, high quality bus stop amenities and infrastructure including benches, shelters, pedestrian-scale lighting and bike parking; the TMP supports this recommendation.

Windsor will be applying the Transfort Bus Stop Design Standards and Guidelines for Type II—Bench Stops. Figure 42 and Figure 43 highlight examples of this type of bus stop. Based on the ridership and funding availability, additional higher-cost amenities should be considered in the future. The most effective amenities are real-time arrival information (that reduced perceived wait time) and heated shelters that allow for more comfortable year-round use of transit.

Windsor will be applying the Transfort Bus Stop Design Standards and Guidelines for Type II—Bench Stops. **Figure 42** and **Figure 43** highlight examples of this type of bus stop. Based on the ridership and funding availability, additional higher-cost amenities should be considered in the future. The most effective amenities are real-time arrival information (that reduced perceived wait time) and heated shelters that allow for more comfortable year-round use of transit.

Figure 42: *Example of bus stop based on standards, Fort Collins*

Figure 43: *Example of bus stop based on standards, Fort Collins*

LOCAL ON-DEMAND TRANSPORTATION

On-demand transportation, or ride-hailing, uses a web-based platform (usually a mobile app) for prearranged and on-demand transportation services that matches passengers with drivers. Drivers opt-in to provide this service, and fees and wait time are determined based on supply and demand. Digital applications are used for booking, electronic payment, and ratings. Uber and Lyft are currently the ride-hailing providers, or Transportation Network Companies (TNCs), operating within the northern Colorado region, however, there is usually a limited supply of drivers available at any one time (making prices high) and there are times where there are no Uber or Lyft drivers available. There are currently other private transportation services that operate in the region including taxi companies, limousines and shuttles that provide similar services but often requiring advanced reservations or wait times that are higher than TNCs. A local on-demand service that is integrated with other available modes in Windsor and promoted by the Town will expand the landscape of transportation options available to residents, visitors and employees; this Town-supported service allows residents to age in place as driving is a less viable option, and provides households the option to be car-free or car-light.

There are a number of operational models that Windsor can explore to provide optimized local on-demand transportation service. **Appendix D** contains a matrix of example operational models, case studies and lessons learned with greater detail. There are a number of characteristics of the operational model described here at a high level. These components should be defined more extensively as a part of a feasibility study, per the recommendation at the end of this section.

- **Provider-** Windsor should consider providers that have the following capabilities:
    - On-demand, door to door service, that can meet an average wait time of 15 minutes or less
    - A mobile application with ride booking and GPS-enabled location tracking
    - Data sharing abilities
    - Ride sharing option to pair riders based on origin, destination, and departure/arrival time
- **Booking mechanism-** Two booking mechanisms should be provided for on-demand service users: a mobile application and a concierge

service. To meet Americans with Disabilities Act (ADA) requirements, the mobile application and concierge service, taken together, must be accessible to people with visual, auditory, and/or cognitive disabilities.

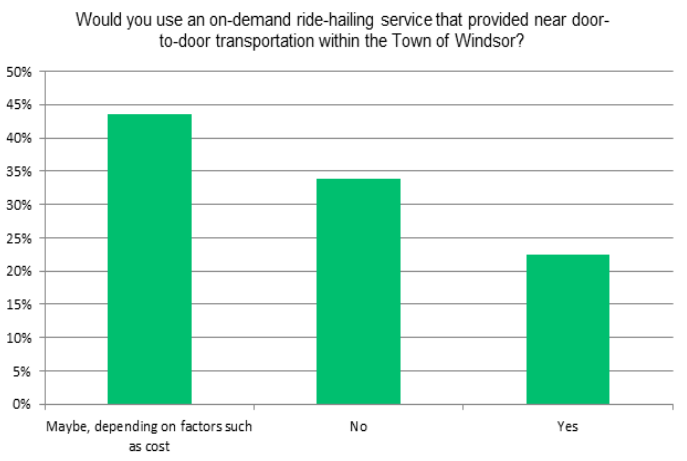
- **Pricing and payment-** Several potential pricing structures could be applied to on-demand service. If the funding is available, the Town of Windsor should consider partially or fully subsidizing on-demand service. If the user needs to pay a fare, it should be integrated within a trip booking app as well as with the payment for a Greeley Evans Transit fixed route ticket. This fare should also be a flat fee rather than a percent of the total trip cost to increase intuitiveness and predictability for a user. While private TNC services are generally booked and paid for through a smartphone app, this on-demand service will allow cash payments so as to equitably serve all users.
- **Integration with GET regional service-** On-demand service should be seamlessly integrated with other fixed route services. The two most effective means of integrating these services is through trip planning and payment integration. The Town should consider working with a third-party developer to create a trip planning and booking mobile application that allows for the planning, booking, and payment for all modes in an easy-to-use platform that makes transferring seamless.
- **ADA considerations-** ADA prohibits discrimination against people with disabilities and guarantees that they have equal access to employment, goods, and services. The U.S. Department of Transportation has ADA regulations for public transit service providers, including the operators of on-demand ("demand responsive") services and contractors to public transit agencies. These rules affect how partnerships with on-demand service providers operate in two ways:
  - It must provide equivalent service to individuals with disabilities (including wheelchair users) and other individuals. The service provided to people with disabilities must be equivalent with respect to response time, fares, coverage area and hours of service, access to reservations and information, restrictions on use, and overall capacity and availability of service.
  - While the on-demand vehicle fleet may include some non-accessible vehicles, the fleet as a whole must provide an equivalent level of service to riders who use wheelchairs as it does to other riders.
- **Marketing-** Based on the lessons learned in the pilot programs examined in the case studies and literature review in association with **Appendix D**, marketing and branding is crucial to educate potential customers about an on-demand transit service and users' expanded set of transportation options. The objectives of marketing are: to build awareness of the new service, educate users on how this service operates seamlessly with existing transit service, target outreach to key populations (including commuters, low-income users, visitors), address and anticipate riders' concerns, and develop a high level of satisfaction with the new service.

- **Evaluation and Phasing-** The Town should consider first implementing an on-demand service as a six-month pilot. Ongoing data collection, data analysis and evaluation of the pilot are important components of this program. Appropriately evaluating success is important given that a preliminary on-demand program is intended to be a pilot, and dynamic in nature as qualitative and quantitative feedback are received. If the pilot is successful, the Town should consider longer implementation and the expansion of service hours or a service area boundary.

The TMP outreach process asked the community if they would use a local ride-hailing service if it was available in Windsor. **Figure 44** show the breakdown of the nearly 300 respondents, with 2/3 of respondents saying they would or maybe would support the implementation of local on-demand transportation services.

The Town of Windsor should pursue a more in-depth study to explore the feasibility of implementing an on-demand service. This in-depth study would include an expanded and more data-driven and community-based approach to identifying a recommendation under each of the operational characteristics in this section. Exploring a point to point on-demand service within the Town boundaries is supported preliminarily by the community (Figure 44). It is in line with the Town's vision and goals of providing transportation service for all, and would help supplement regional service.

Figure 44: *Public responses on the use of on-demand service*



7 | Roadway Network

UPDATES TO THE ROADWAY IMPROVEMENT PLAN

The TMP builds off the *Roadway Improvement Plan* (2017), which serves as a guide for future roadway systems planning. The *Roadway Improvement Plan* includes: a set of roadway projects, updates to typical roadway cross-sections, updates to the street classification system, and updates to unit cost estimates of proposed roadway improvements. The TMP recommends updates to the *Roadway Improvement Plan* based on an updated roadway inventory, traffic volume data, and 2040 population and employment forecasts. The TMP's updates include the following (shown in **Figure 45** and **Appendix E**):

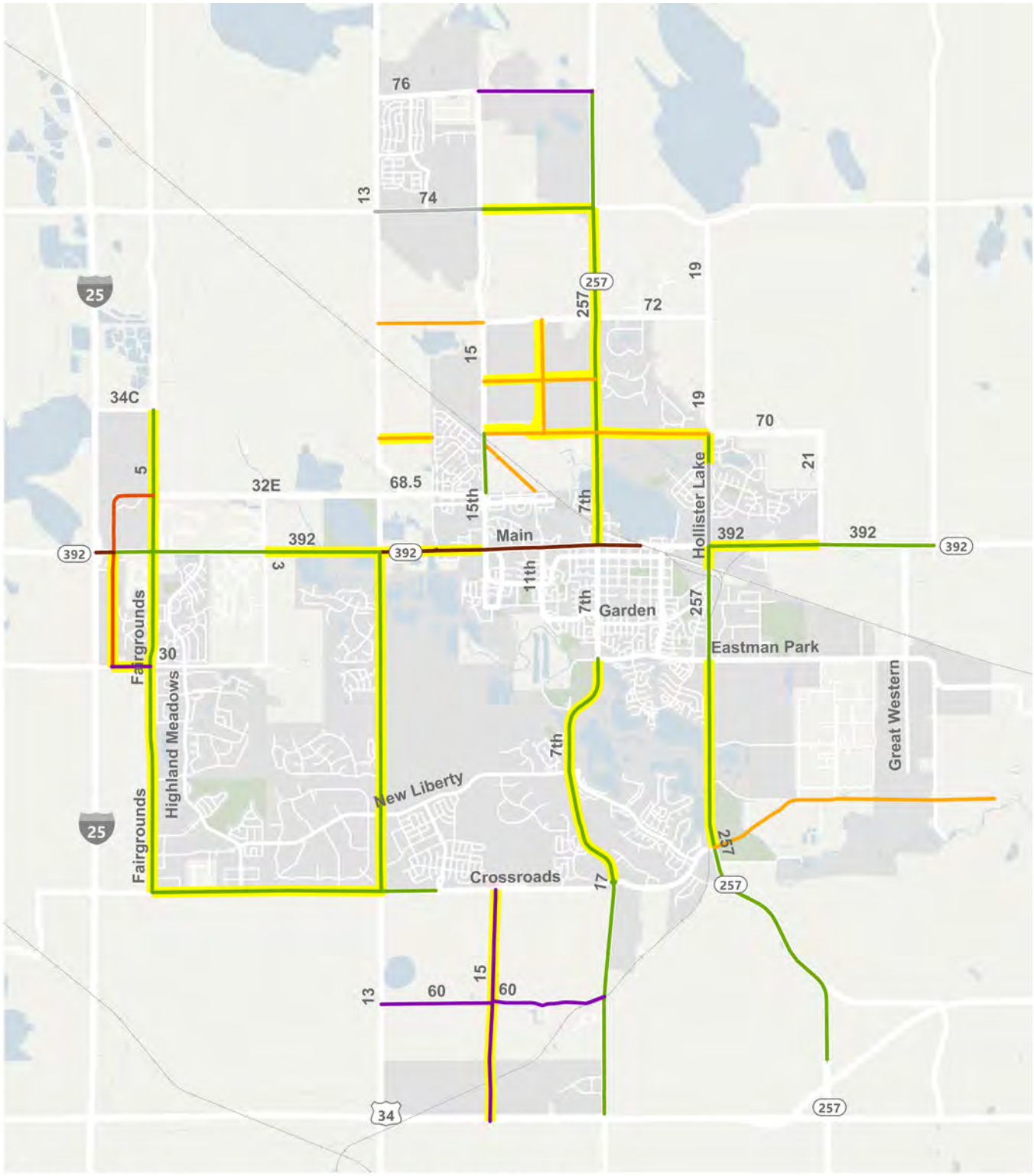
- Projects that have been completed since the adoption of the *2017 Roadway Improvement Plan*
- Multimodal projects that have a bicycle/pedestrian component in addition to vehicular recommendations, denoted by a yellow highlight in **Figure 45**
- Modifications to project extents and respective costs, as shown in **Appendix E**

The roadway projects address the complete and connected grid of major roadways for the Town and immediately adjacent area; however, many of these are collaborative projects involving not

just the Town of Windsor, but also developers, neighboring jurisdictions, the NFRMPO, and Larimer and Weld counties. Roads that are not adjacent to Windsor development or are split between other jurisdictions in Windsor will require further discussion amongst applicable jurisdictions and stakeholders. Many of these recommendations are also site specific and have contextual challenges such as bridges, right of way, and sensitive environmental areas, that will need to be analyzed further.

The Town's current priority is to maintain and upgrade existing roadways to meet capacity. New roadways are normally funded and constructed in association with new private development.
This Town is currently working on the widening of SH 392 from 17th Street to WCR 13.

Figure 45: *Recommended roadway projects*



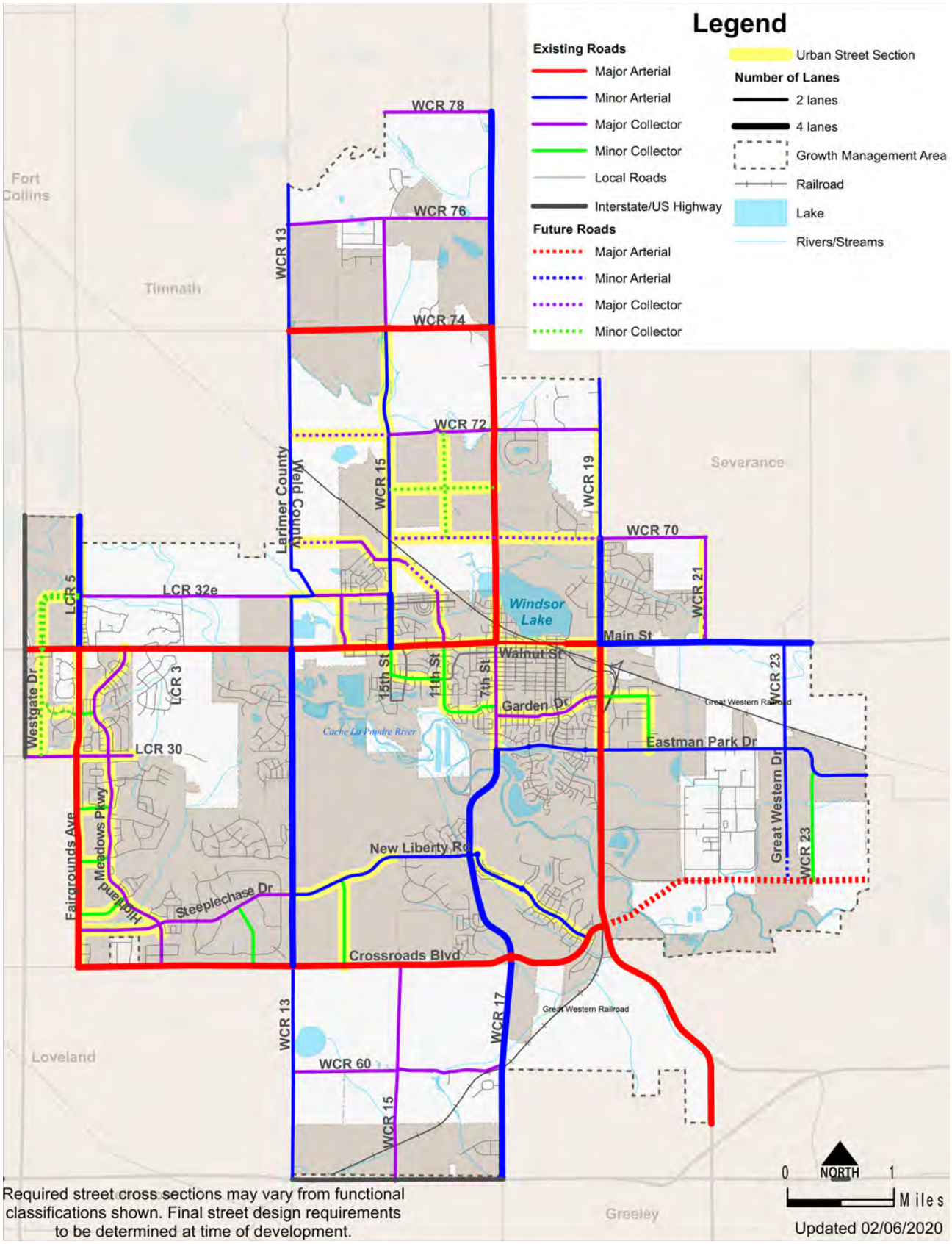
Roadway Projects

- Widen Two to Four Lanes
- Pave
- New Road
- Monitor for Needs
- New Road and Monitor
- Study to Determine
- Completed Since 2017 Plan
- Multimodal Proiects

As a part of the TMP, the roadway classification of existing and future roadways from the *Roadway Improvement Plan* was also updated. **Figure 46** shows the recommended 2040 roadway classifications, as they were updated from the *Roadway Improvement Plan*. These updates include:

- Covered Bridge Parkway changed from future to existing
- Westgate Drive from LCR 30 to SH 392 changed from Major Collector to Minor Collector
- Westgate Drive from SH 392 to CR 5 widened to 4 lanes
- Main Street from WCR 19/SH 257 to GMA boundary widened to 4 lanes
- Guardian Drive realigned west of WCR 15 and changed from future to existing
- Steeplechase Drive from Highland Meadows Parkway to Fairgrounds Avenue changed from future to existing
- SH 257 from south end of Windsor Lake to WCR 72 changed from urban to rural
- WCR 21 changed from rural to urban
- 11th Street changed from rural to urban from Main Street to northern Town boundary
- 15th Street changed from rural to urban from WCR 74 to WCR 76
- 17th Street changed from rural to urban from Main Street to LCR 32e
- Main Street from CR 13 to 17th street changed from urban to rural

Figure 46: *Recommended 2040 roadway classifications*



Required street cross sections may vary from functional classifications shown. Final street design requirements to be determined at time of development.

CO 257 AND CO 392 NETWORK FEASIBILITY STUDY

In October 2019, the *CO 257 and CO 392 Network Feasibility Study 2019 Final Report* prepared for CDOT by Stolfus and Michael Baker International explored a potential bypass of SH 392 and/or SH 257 that run through the Town of Windsor. This study evaluated east/west travel demand in the study area with a focus on improving congestion today and in the future on SH 392 and in particular, downtown Windsor. A proposed new connection from SH 392/ WCR 23 to Crossroads Boulevard/SH 257 and two other alternatives were evaluated in attempt to reduce congestion through downtown Windsor. This study was informed by past studies, stakeholder feedback, and public outreach, which ultimately redirected the project in search of details regarding travel patterns in the area.

Three build alternatives were evaluated to determine the potential respective impact to the transportation network. The scenarios and their respective results are shown in **Table 4**. **Figure 47** shows the result from the North Front Range MPO Travel Demand Model in the no-build scenario. The study found that the alternative alignments and proposed SH 392 to Crossroads connection would not produce the desired reduction in congestion on Main Street.

Figure 47: *Future no-build model results*

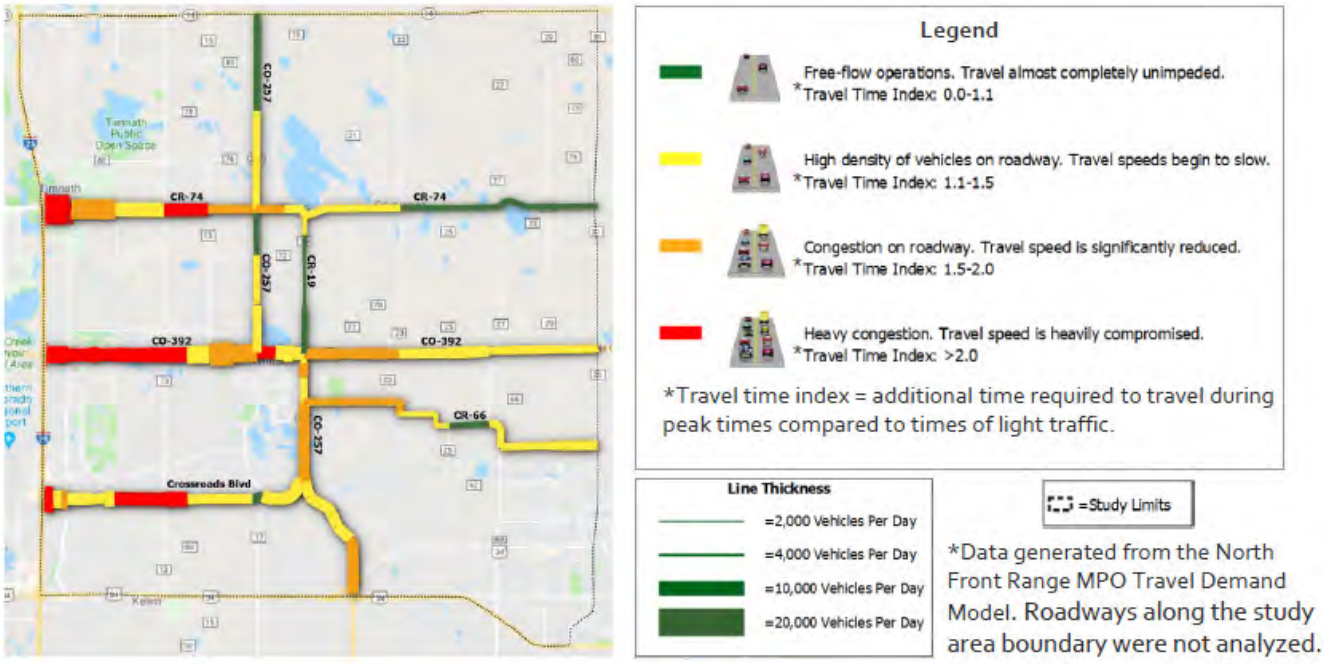


Table 4: *Three build alternative scenarios*

BUILD ALTERNATIVE	DESCRIPTION	SUMMARY OF IMPACT
SH 392 to Crossroads Connection	Considered a new roadway that would connect the intersections of SH 392/WCR 23 and SH 257/ Crossroads Boulevard	Draws trips from parallel north/south roads (i.e. SH 257, Great Western Drive, SH 23 and WCR 25), minimal impact to Main Street
Main Street Urbanization	Simulated traffic calming treatments to reduce speeds and discourage trips	Diverts traffic from main Street to parallel local roads
O Street Connection	Evaluated the impact of a proposed O Street extension	Draws trips from Eastman Park Drive & US 34 Business, increases volume on Crossroads Boulevard, minimal impact to Main Street

This study had a number of major findings, including:

- The predominant traffic movements in the region occur in a northwest to southeast orientation with very little traffic heading to and from Denver.
- Nearly 70% of trips on SH 392 between WCR 13 and WCR 19 have an origin or destination local to Windsor.
- The proposed SH 392 to Crossroads Boulevard connector does not provide significant congestion relief to the region or to the constrained section of Main Street through downtown Windsor.
- Additional improvements on WCR 19, combined with the SH 392 to Crossroads Boulevard connector will not attract enough traffic to eliminate the need for capacity improvements on Main Street.
- The proposed O Street Connection provides relief to adjacent east/west routes (not SH 392).
- With all three alternatives in place only one out of five trucks would be removed from Main Street.

The recommendations that come from these finding are:

- Continued investment will be required by all impacted stakeholders to address growth on all major arterials and congestion along east/west routes in the study area. This includes: SH 392, SH 257, Harmony Road (WCR 74) and Crossroads Boulevard.
- Due to the increased mobility and congestion relief that the O Street Connection would provide, Greeley, Windsor, and Weld County should continue their investment into the O Street Connection.

- Windsor should continue to improve the Town's collector and arterial transportation network to minimize the impact of traffic on local roads while providing residents with route options.
- Continue to evaluate the transit route from Greeley to Fort Collins with stops in Windsor to provide alternative modes of transportation for the 38% of trips on SH 392 that could potentially use it.
- CDOT and Windsor should work with the Colorado Motor Carriers Association to reduce truck traffic on Main Street through alternative routes or other means.

- The local municipalities should consider conducting additional analyses of high crash locations to evaluate whether the presence of traffic signals, the existence of sight distance obstructions, or high volume intersections are the cause of the high crash rates.

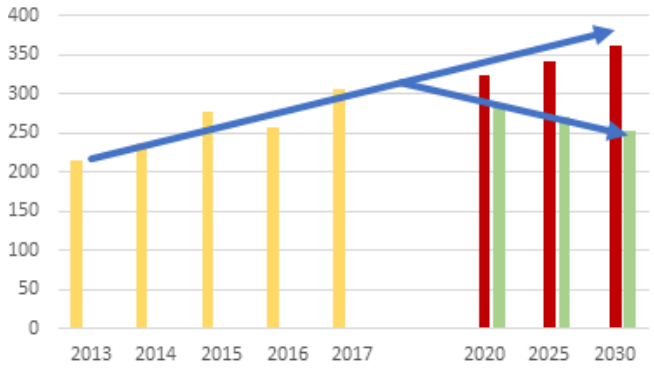
  See **Appendix F** to review the complete *CO 257 and CO 392 Network Feasibility Study 2019 Final Report*.

8 | Safety

AS IDENTIFIED IN THE DISCUSSION OF EXISTING SAFETY CONDITIONS, THE TOWN OF WINDSOR EXPERIENCES TRAFFIC CRASHES AT A RATE SIMILAR TO (OR SLIGHTLY BELOW) PEER CITIES IN THE REGION, AND THE NUMBER OF CRASHES IS INCREASING OVER TIME PROPORTIONAL TO OVERALL TRAFFIC VOLUME.

This section discusses three recommendations that cumulatively comprise a *crash reduction program* to decrease the crash rate over time, as shown in **Figure 48** with forecasted future year crashes.

Figure 48: *Past and Potential Future Crashes by Year*



RECOMMENDATION 1: INSTITUTE AN ANNUAL ROAD SAFETY PROGRAM

Nearly all traffic crashes are preventable, but some are more easily corrected with infrastructure. For example: crashes caused by intoxicated drivers are not easily corrected by changing the road network, but crashes caused by insufficient sight distance might be. Infrastructure investments should be targeted at the most-correctible types of crashes and determining the best allocation of funds requires in-depth analysis of crash patterns at different locations over time.

Under an Annual Road Safety Program, the street network is analyzed on an annual basis to monitor trends and identify "hot spot" areas with a high concentration of traffic crashes. The number of crashes will vary with traffic volume so it's useful to analyze intersections by crash rate. Some intersections will experience higher crash rates than other geometrically similar intersections; when this disparity is high it's more likely that a correctible issue is causing the difference. Tracking which intersections have large crash rate disparities over several consecutive years will identify the locations where infrastructure improvements are most likely to yield large reductions in the crash rate. This is known as Safety Performance Function (SPF) analysis described in greater detail in the Highway Safety Manual (HSM).

In order to perform this analysis, the Town should continue to collect data on every crash that occurs. This crash data should be carefully coded with the standard categories of information used crash analysis: precise location, time and date, weather, lighting, crash type, vehicle travel directions and movements, speeds, pavement condition, and any citations issued to either driver. The value of crash analysis is limited by the consistency of the data used as an input, so It's vital that law enforcement officers receive initial and periodic training in crash coding procedures to ensure that first responders report crash statistics in meaningful ways.

Each year, the Town should create a crash heat map to determine the high crash locations, or hot spots, normalized by traffic volume. Staff can analyze specific crash patterns at each intersection to determine the most applicable countermeasure. The results of the analysis can be used to select and prioritize intersection improvement projects and apply for grant funds such as the CDOT-funded Highway Safety Improvement Program.

This program is well-suited to a town-wide annual effort because it requires collecting a large amount of data. Once data collection methods are in place,

annual updates require less time and energy than executing a standalone project. Annual reports can be prepared summarizing safety performance during the past year, tracking identified high crash "hot spots" around town, and discussing the progress correcting any identified crash patterns.

RECOMMENDATION 2: ADOPT AND PROMOTE A TOWN-WIDE TOWARD VISION ZERO INITIATIVE

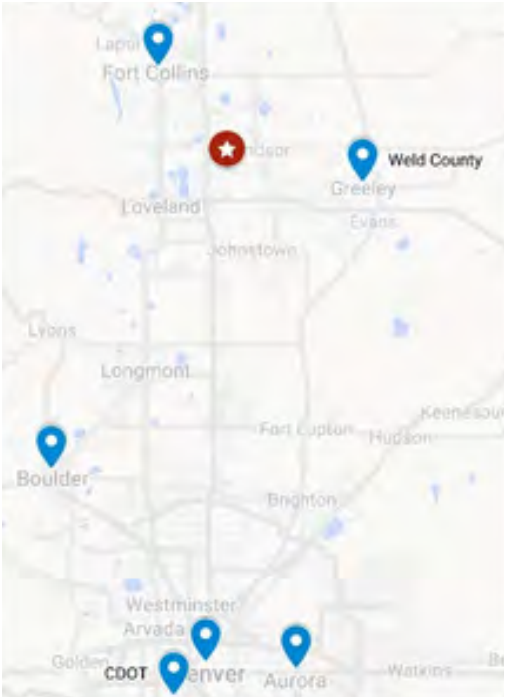
Vision Zero is a worldwide initiative to redesign transportation networks around the principle that no traffic fatalities are acceptable. Many governments are adopting "Toward Vision Zero" initiatives refocusing infrastructure priorities toward safety; Colorado participants are shown in **Figure 49**. Toward Vision Zero initiatives can take many different structures, but the overarching concept is always the same: to promote the idea that all traffic deaths are preventable, to set an explicit goal of achieving zero traffic fatalities, and then work toward that goal.

A Toward Vision Zero initiative for the Town of Windsor could have several components:

- Use the results of the annual road safety program to apply for safety improvement grant funds.
- Begin public outreach targeting cell-phone users and distracted, fatigued, or intoxicated drivers.
- Convene a rapid response team after every traffic fatality.

The Colorado Department of Transportation (CDOT) offers several grant programs that provide funds for safety improvement projects including Funding Advancements for Surface Transportation and Economic Recovery Act of 2009 (FASTER) and the Highway Safety Improvement Program (HSIP). Successful applications require that the applicant demonstrate potential for crash reduction and that the benefits of reducing crashes will outweigh the costs of infrastructure improvements; both results that can easily be produced by an annual road safety program (discussed in Recommendation 1). A Toward Vision Zero initiative can use the results of the analysis to apply for grant funds to be used for infrastructure improvements at identified high crash locations.

Figure 49: *Communities with Vision Zero programs and/or Certified Safety Partners*



Concurrently, the Toward Vision Zero initiative can conduct public outreach to remind road users about their own responsibility to participate safely when using the public road network. Of the five fatalities identified in Windsor during the five-year crash analysis period, two involved intoxicated drivers and another two involved distracted or fatigued drivers. Very few infrastructure improvements are available that can effectively prevent crashes caused by intoxication, distraction, or fatigue, so the best intervention available to prevent this type of crash may be public outreach, education, and awareness. More information is available from the Vision Zero Network Resource Library (https://visionzeronetwork.org/).

When traffic-related fatalities or severe injuries do occur, communities moving toward Vision Zero react differently: many have chosen to convene rapid response teams. This preselected group of experts are notified immediately when a fatal crash occurs and meet on-site to reconstruct the crash and identify and encourage action on strategies to prevent similar crashes in the future. Rapid response teams are interdisciplinary and interjurisdictional allowing them to identify problems and explore solutions outside of traditional silos within their own organizations. The point is not to assess blame or liability but rather to identify steps that can be taken to minimize the risk of future crashes. A rapid response team for the Town of Windsor could include:

- Employees from the Windsor Department of Engineering or Public Works
- A Public Information Officer (PIO)
- Officers from the Windsor Police Department and Larimer or Weld County Sherriff's Department, and the Colorado State Patrol (if appropriate)
- Representatives from CDOT or Larimer or Weld County public works (for crashes occurring within their jurisdictions)
- A member of the Toward Vision Zero program steering committee
- An on-call Civil or Traffic Engineering consultant or crash reconstruction expert
- The rapid response contributes to the annual road safety program to ensure that fatal events are adequately understood and documented so the proper resources can be applied to prevent fatal events from happening in the future.

The rapid response contributes to the annual road safety program to ensure that fatal events are adequately understood and documented so the proper resources can be applied to prevent fatal events from happening in the future.

RECOMMENDATION 3: DEVELOP A DOWNTOWN BICYCLE AND PEDESTRIAN SAFETY PLAN

As identified in the existing conditions section, the majority of bicycle and pedestrian crashes occur in the downtown Windsor area. This is likely due to the increased density of both residents, attractive destinations and higher levels of pedestrian and bicyclist activity. Safety, and the perception of safety, for bicyclists and pedestrians should be proactively addressed. Windsor is already taking steps toward addressing both critical issues with the development of a low-stress network for bicyclists and improved

pedestrian crossing treatment guidelines, both of which will have benefits for user safety and help lower the total crash rate across the entire town. A Downtown Bicycle and Pedestrian Safety Plan can help drive those initiatives toward completion.

A plan for bicycle and pedestrian safety downtown could have several components. Bicyclists are more likely to use facilities where they feel comfortable, and diverting bicyclists onto bicycle-specific facilities (and away from higher-volume streets) can reduce crash rates and improve the perception of safety for all road users. The TMP, specifically **Chapter 5**, contains recommendations for the development and implementation of a low-stress bike network including Protected Bike Lanes and Neighborhood Greenways. In parallel, Windsor can adopt a sub-area plan for the downtown area that promotes and funds targeted interventions for bicycle crash hot spots identified in the annual road safety program. Growing the low-stress network and proactively addressing dangerous areas for cyclists will have long-lasting impacts toward lowering the overall crash rate in Windsor.

Pedestrian safety should be addressed with two programs, both organized through the Engineering Division:

- Pedestrian Crossing Guidelines (completed December 2018)
- Pedestrian Program described in **Chapter 5**

Crash trends nationally show that most pedestrian crashes occur either at uncontrolled crossings or when pedestrians are walking in the street due to a lack of sidewalks. Continued implementation of the Town's Pedestrian Crossing Guidelines is critical in reducing pedestrian related crashes.

Sidewalk gap completion is discussed in **Chapter 5**. Completing sidewalk gaps will have positive effects on safety as well as connectivity and neighborhood quality of life and is especially important around schools where children may be walking. Details on addressing pedestrian safety near schools can be found in **Chapter 9** and the proposed Safe Routes to School program. Applicants for CDOT's Safe Routes to Schools (SRTS) grant funding program are most successful when they can supply a large amount of data – data from an annual safety analysis program, for example – to support the case that grant funds will materially increase safety and the number of students walking to and from school.

DUTCH BROS

9 | Programs and Policies

SAFE ROUTES TO SCHOOL

Safe Routes to School (SRTS) programs are designed to make it safer for students to walk and bike to school, and thus encourage more walking and biking. In Windsor, a SRTS program is essential to the TMP's vision of providing a safe multimodal network for *all ages*, with a SRTS program focusing on school-aged children and creating safe connections to schools. The components of a successful SRTS program include the "six E's" according to the national Safe Routes to School Partnership:

- Education – Providing students and the community with the skills to walk and bicycle safely, educating them about benefits of walking and bicycling, and teaching them about the broad range of transportation choices.
- Encouragement – Generating enthusiasm and increased walking and bicycling for students through events, activities, and programs.
- Engineering – Creating physical improvements to streets and neighborhoods that make walking and bicycling safer, more comfortable, and more convenient.
- Enforcement – Deterring unsafe traffic behaviors and encouraging safe habits by people walking, bicycling and driving

in school neighborhoods and along school routes.

- Evaluation – Assessing which approaches are more or less successful, ensuring that programs and initiatives are supporting equitable outcomes, and identifying unintended consequences or opportunities to improve the effectiveness of each approach.
- Equity – Ensuring that Safe Routes to School initiatives are benefiting all demographic groups, with particular attention to ensuring safe, healthy, and fair outcomes for low-income students, students of color, students of all genders, students with disabilities, and others.

Windsor has already implemented a number of SRTS program projects including support for an annual Walk and Bike to School Day, extensive surveying of parents, and an educational course.

The Town should expand and formalize the SRTS program. This SRTS program should invest in all schools in Windsor. However, several schools stand out as great candidates for enhancing the ability of students to walk or bike to school and should be prioritized as funding becomes available.

Based on gaps in the existing bicycle and pedestrian networks, the connectivity to the school, crash data, and surveys conducted to understand current travel behavior to and from school and barriers to walking and biking, the following schools have been identified as high priority schools of emphasis for a more formalized pilot SRTS program:

- Skyview Elementary School
- Tozer Elementary School
- Windsor Middle School
- Windsor High School

The bicycle and pedestrian sections of this plan detailed in **Chapter 5** show the low-stress bike network and the pedestrian networks; the Engineering component of the proposed SRTS program should refer to the recommendations and priorities in this chapter. Proximity to schools and crash history were both factors used in project identification and prioritization, with projects close to schools and near crash hot spots considered higher priority. Geographic equity was also considered in the process, selecting projects that comprehensively cover the Town of Windsor area.

The SRTS program should incorporate encouragement and education through marketing, promoting and incentivizing walking and biking. For example, continuing to host and increasing participation in Walk or Bike to School Days will encourage and educate people on the benefits and ways to walk and bike to school comfortably and safely. Additional programming could include Walk or Bike to School week or month with ongoing tracking for incentives, or a walking school bus,

which is a group of children that walk to or from school with one or more adults to supervise. Evaluation can be achieved through maintaining an open forum for communication between parents, teachers, students, school staff, and the Town of Windsor staff who manage the program and continuing to conduct surveys on travel behavior to and from school and barriers to walking and biking. The process of education, encouragement, and evaluation can be infused with equity through maintaining the opportunity for input and engaging directly with schools that may not be receiving the same benefits from the program.

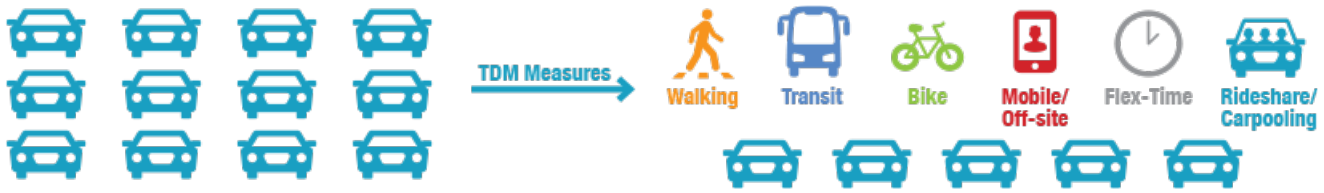
Enforcement can take many forms in a SRTS program. The Town of Windsor can work with schools to identify if there are particular behaviors that cause safety issues that could be alleviated through a form of enforcement of better practices, and how to generally enhance awareness of school zones where children may be present.
A SRTS program opens up new funding sources for the promotion of safe walking and biking and implementation of multimodal infrastructure. Almost all funding for SRTS is federal but distributed at the state level. CDOT provides SRTS funding through Transportation Block Grant funding, with the new SRTS grant application window in August 2020. The Town should partner with neighbors including Severance, since the Weld RE-4 school district serves both Windsor and Severance schools. There are a range of project types eligible for SRTS funding, including campaigns, educational initiatives, sidewalk and crossing repairs, and equipment pilot programs. The Town of Windsor is most likely to be successful for grants to implement infrastructure that improves bicycle and pedestrian safety by formalizing the SRTS program, including ongoing action items to collect data on travel behavior to and from schools. A well-organized and complete SRTS program will benefit transportation in Windsor by providing users with a range of transportation options and enhance the real and perceived safety of those options. When the focus of transportation planning and design is on the most vulnerable users, children walking and biking, the safety benefits reach everyone. Increased walking and biking provide environmental and health benefits to students, but also provides the transportation benefits of reduced traffic congestion and lower transportation costs for school districts and families. Safer streets, reduced congestion, and a greater share of trips occurring through walking and biking all support the vision of the TMP.

More information and resources on Safe Routes to School can be found through the Safe Routes to School National Partnership: https://www.saferoutespartnership.org/.

TRANSPORTATION DEMAND MANAGEMENT

Transportation demand management (TDM) is a program of strategies to promote the use of modes other than single occupancy vehicles (SOV) by helping people better use the existing infrastructure and services, as highlighted in **Figure 50**. TDM can include a wide range of approaches to shift behavior, such as education of transportation options, incentives and encouragement to use alternative modes, and disincentives for driving alone.

Figure 50: *TDM Approach*



A TDM program in Windsor can help optimize the transportation resources available, and the resources that will become available as a result of this plan. A robust TDM program could potentially include marketing and education of transportation options, trip planning smartphone applications, bus stop amenities, transit service improvements, parking supply management, carpooling apps and programs, partnerships with on-demand transportation providers, bike share, car share, and employer-led TDM programs.

These strategies were discussed amongst a wide range of stakeholders and Town staff and considered in tandem with public input through the process of developing the TMP. Of all strategies considered, the following three strategies were identified as the highest priorities and those likely to have a positive impact on optimizing transportation resources and managing transportation demand in Windsor:

- Marketing and promotion of transportation options
- Supporting employer-led TDM programs
- Enhancing and maintaining bus stop amenities

MARKETING AND PROMOTION OF TRANSPORTATION OPTIONS

Information sharing and marketing are important components to a successful TDM. The Town of Windsor can lead marketing efforts by promoting transportation options through existing digital and print communication streams such as the active Facebook page, NextDoor, and Twitter. Information should include updates to regional transit service and progress on bicycle and pedestrian projects, and include the low-stress bike network for reference. Additionally, new residents can be provided informational brochures about their transportation options in Windsor. These materials can also encourage the use of a trip planning app

that shows people transportation and trip options for using a combination of modes. The Town can partner with a third-party provider for these services or promote the Google maps features as they exist to show biking, walking, and transit options. This service should include route options, cost and time comparisons, and can even consider Greenhouse Gas (GHG) emissions.

SUPPORTING EMPLOYER-LED TDM PROGRAMS

The Town of Windsor can support employers in leading their own TDM programs and initiatives. Employer-led TDM programs can include flexible scheduling and work from home flexibility to reduce the number of vehicles on the roads at peak times. These programs can also include incentives to employees for traveling via transit, carpool, biking, or walking. End of trip facilities for bicyclists, such as secure bicycle parking, and guaranteed ride home services are additional strategies for employers to consider. Maintaining open communication for employers to contact the Town about TDM strategies and multimodal infrastructure issues or requests is a key way for the Town to support employer-led TDM programs. The Town of Windsor should distribute information and marketing materials to employers to aid in their TDM efforts, including marketing of a designated trip planning app. Through the continued investment in the multimodal network and being responsive to maintenance requests, the Town of Windsor can enhance the effectiveness of employer-led TDM initiatives by providing better multimodal options for people getting to work.

ENHANCING AND MAINTAINING BUS STOP AMENITIES

While Windsor is initially deferring to Transfort's bus stop standards, these should be considered for enhancement over time. Enhanced amenities at bus stops can help make transit a more convenient, intuitive transportation option and thus can be an effective TDM strategy. Enhanced bus stop amenities can include real time transit displays in addition to posted schedule information, bus benches and shelters, trash cans, and information on wayfinding. Additionally, appropriate lighting and adequate sidewalk access is necessary at bus stops. Bus stops should undergo regular maintenance, and information on who to contact if maintenance is needed can be included at each bus stop.

MAINTENANCE

The Town of Windsor has extensive transportation resources, and is continuing to invest in these resources. Windsor must maintain what exists before building new infrastructure. Maintaining the condition and accessibility of the street, trail, and pedestrian facility networks is critical to fulfilling the vision set forth in this plan, including the goal to be fiscally responsible with the transportation system. When considering multimodal maintenance, the conversation moves from beyond the generalized maintenance of streets but includes the bike facilities both on and off street, pedestrian facilities of sidewalks, curb ramps, and crossings and crossing devices, and transit related infrastructure.
The following is a list of maintenance practices the Town of Windsor should consider:

1. 1. The Town has engaged in a Pavement Management Program (PAVER) for nearly 15 years, which includes overlays, slurry seals on urban roads, chip seals on rural roads, and crack sealing. The Town also has a Miscellaneous Concrete Replacement Project that repairs sidewalks along streets not scheduled for an overlay.

The Town of Windsor should enhance the current pavement maintenance and sidewalk concrete replacement program to include standards and upkeep for bicycle facilities and preventative maintenance on high-use facilities and those with vulnerable users.

Pavement standards can be distinct from typical road standards for bike facilities, given bicyclists greater sensitivity to pavement issues as compared with vehicles. Windsor should write standards to be inclusive of preventative maintenance particularly on high use facilities, or facilities with proportionately more vulnerable users, such as children or older adults. Upkeep of bike lane and crossing striping should be included in the standards.

2. The Town of Windsor can set a routine maintenance schedule for traffic signals, walk signals, and pedestrian signal devices. Routine maintenance can occur semi-annually, independent of rapid response when there is a maintenance issue or need.
3. The Town of Windsor can take geospatial inventory of all multimodal signs, such as signs indicating the presence of bicyclists and pedestrians, and repair and replace signs as necessary. The Town can approach this task by surveying streets for all signs by street classification—arterials then collectors then local streets. GPS devices can be used in the field to collect geospatial information that can easily be imported into GIS. After a shapefile all signs is created, a maintenance log within GIS should be kept to ensure each sign is checked for its state and condition every year.
4. The Town of Windsor can continue to work with CDOT, regional partners, and neighboring jurisdictions to create truck routes to minimize maintenance needs, by focusing impact on specified corridors. Truck routes should be re-evaluated during planning and at the completion of major roadway infrastructure projects.
5. The Town of Windsor can build off the existing Snow and Ice Control Plan to modify winter snow removal standards to ensure timely and effective removal of snow and ice from bicycle and pedestrian facilities. The current plan does not address the plowing of bicycle facilities or pedestrian facilities (apart from sidewalks that are the responsibility of the property owner). The updated plan should include language to ensure snow from other parts of the right of way is not moved and stored in bike facilities or sidewalks. When the protected bike lanes proposed in the low-stress bike network are implemented, this should include the acquisition of a small space

snow removal vehicle. Windsor should update the plan's =prioritization of roadways that receive plowing after a snow storm. Windsor should include in the prioritization approach the maintenance of roadways based on roadways with a bicycle facility, proximity to schools and transit stops, density of residents and employees near the facility, and by considering level of use of a facility. Additionally, routes should be prioritized that do not have alternative route options. Trails and sidewalks should be cleared to the pavement surface level. The Town should strive to have multimodal infrastructure cleared within 24 hours of a snow storm.

6. The Town of Windsor can further solidify a response team to deploy for the investigation of maintenance issues or complaints, and develop a team to improve resolution time.

The cost of maintenance efforts is highly variable dependent on the available resources and equipment, scope of maintenance desired, and what level of maintenance is necessary in any given year. A high-level estimate for maintaining bike lanes and bike boulevards is roughly $1,000 per mile per year; this includes increased sweeping, and occasional pavement marking maintenance. It is assumed that these facilities will not require additional plowing since these roadways are already plowed. Multi-use trails and protected bike lanes are estimated to cost about $5,000 per mile per year to expand the sweeping and plowing programs (since they will need to be plowed separately), and additional costs if new equipment purchases are necessary to meet the maintenance standards. Trail maintenance may be eligible for federal funds through the Recreational Trails Program (RTP). Between 2010 and 2014, this funding source contributed almost $15 million to jurisdictions for maintenance-related activities. The Town currently evaluates, inventories and replaces all deteriorating curb, gutter and sidewalk through the Concrete Replacement Program. Currently, Windsor property owners and/or occupants are responsible for keeping all sidewalks free of snow and ice. Owners and/or occupants have 24 hours from the time the storm stops to clear the areas for which they are responsible. Although making abutting property owners responsible for sidewalk maintenance is common, this can be a challenge to enforce, keep costs equitable, and create consistency for sidewalk users.

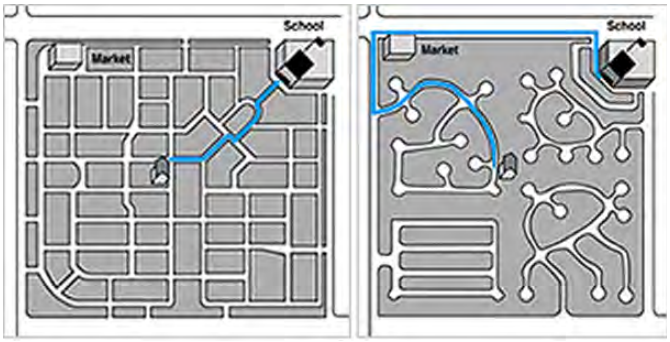
To help address this, the Town can facilitate a Snow Buddies program that matches volunteers with senior or handicapped residents or property owners that need assistance shoveling their sidewalk during the snowy seasons.

This program helps keep senior safe from falls on snow or ice, keeps senior from accruing fines for not being able to shovel, helps ensure that sidewalks are consistently kept clear, and facilitates intergenerational community relations.

GROWTH AND CONNECTIVITY

As a growing community, Windsor is continuing to expand its neighborhoods and street grid with new development. It is important that the Town work with developers to create a street layout based on a grid system. **Figure 51** shows two different types of street grids and the trip between home and school (as an example) on each of the street grids. The grid on the left shows a connected street grid with short blocks, with a direct route on local, low-volume streets between the two key destinations. This direct route shortens the travel distance, provides a number of different route options, and makes biking and walking viable transportation options. The grid on the right consists of many dead-end streets and longer street blocks. A trip on this street grid will be longer and likely on a higher volume street, making biking and walking more challenging.

Figure 51: *Street connectivity illustration (Source: Saferoutesinfo.org)*



For streets with cul-de-sacs, multi-use trails between cul-de-sacs and other destinations can be constructed in three different ways:

- At the time when the subdivision is first developed,
- As a voluntary retrofit, or
- As a mandatory retrofit when the property is sold or redeveloped.

In order to address new development, Windsor should implement the "Street and Blocks" Sec. 17-1-10 component of the subdivision standards, in draft form at the time of the TMP publication.

These standards define a maximum block length and limit the number of dead ends. It can be challenging to retrofit existing cul-de-sacs with connectors, requiring support from property owners, neighbors and elected officials. Because long block lengths can also contribute to poor walkability and connectivity, standards establishing maximum block length are important.

10 | Emerging Mobility

NEW TECHNOLOGIES ARE EMERGING DAILY THAT ARE FUNDAMENTALLY CHANGING THE WAY PEOPLE TRAVEL.

Most of the emerging trends and technologies discussed in this section are still relatively new and are therefore considered only qualitatively in the TMP. However, some have already started to manifest in Windsor and other places around the world. Others are still in early development but will likely impact Windsor as they are more fully integrated into day-to-day mobility over the next 10 to 20 years.

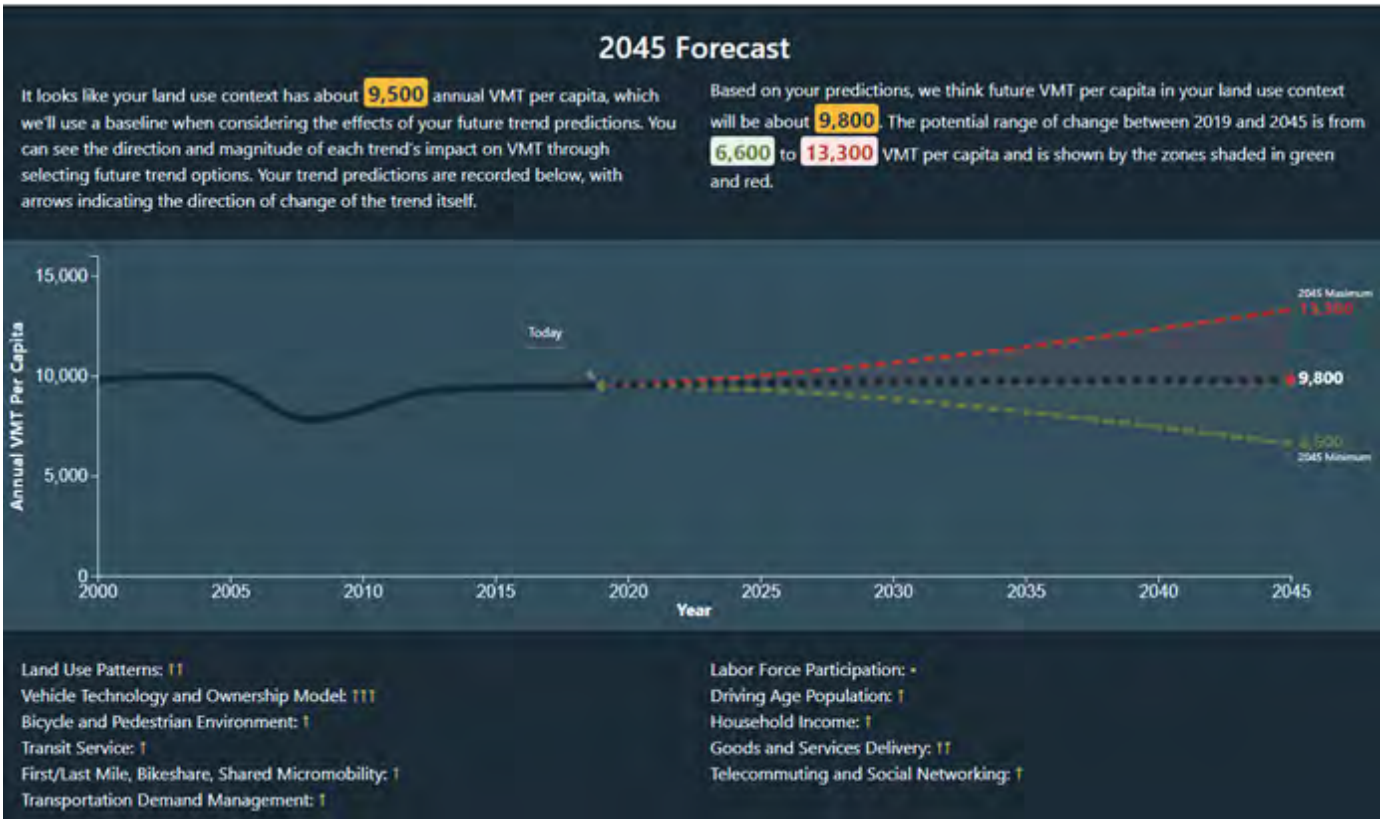
The TMP identifies potential policies, infrastructure, and plans to leverage these emerging technologies so they support, as oppose to detract from, the Town's vision for transportation. Windsor should continue to monitor emerging technologies and identify the potential impacts on the transportation network in Windsor.

TRENDLAB+ WORKSHOP RESULTS

Understanding current transportation trends and forecasting how these trends may influence future travel choices is a critical part of developing a future land use-transportation vision and identifying future transportation projects and policies. To understand how a future Windsor will travel, Fehr & Peers facilitated a TrendLab+ workshop with the Town's management team, taxing districts such as schools, fire and library, and other stakeholders to consider how changing trends may affect future travel patterns and needs. TrendLab+ was specifically designed to provide additional insight about future transportation trends that could be strongly influenced by demographic, social, and economic forces that are not typically included in a transportation analysis. TrendLab+ measures how each of these factors will impact the Vehicle Miles Traveled (VMT) per person.

The results of the TrendLab+ exercise are shown in **Figure 52**. The bottom of the images shows how the majority of attendees voted on various inputs. The magnitude and direction of these inputs that influence transportation trends show that VMT per capita would remain relatively constant over the next 25 years, based on these trend predictions. Given the uncertainty of these and other factors, the shaded areas show the range of how VMT may change. Although VMT per person is anticipated to remain relatively constant, VMT for the region will increase, as Windsor has been continuing to quickly grow.

Figure 52: *TrendLab+ results*



SHARED MOBILITY

Shared mobility—the shared use of a motor vehicle, bicycle, or other low-speed travel mode (such as a scooter)—is an innovative transportation strategy that enables users to have short-term access to a mode of transportation on an as-needed basis. Shared mobility also provides a broader set of transportation options for users that will reduce reliance on the private automobile, therefore mitigating congestion and carbon emissions. Shared mobility is often discussed in the context of micromobility-- small personal mobility devices (<1,000 pounds) including bicycles and scooters. Shared mobility is a key component of Mobility as a Service (MaaS), described later in this section.

BIKE/SCOOTER SHARE

Bike share systems for both traditional and electric bicycles, and more recently electric scooter share, have been a rapidly evolving trend over the last decade and have gained traction in communities both large and small worldwide, shifting the way communities plan for and provide transportation. Bike share and scooter share have the potential to increase mobility options available in Windsor in the future and have been used in other places to improve access to transit, particularly to and from express and regional transit. While bike share and scooter share currently do not exist in Windsor, many nearby communities, including Boulder, Denver, Longmont, and Fort Collins, have bike and scooter share systems in place. If Windsor were to introduce a bike share or scooter share program, it would be important for the Town to work closely with potential operators to design a program that supports the community's land use and transportation goals, while mitigating potential issues. For bike share and scooter share to be successful, Windsor should also continue to invest in and improve bicycle and pedestrian infrastructure as well as ensure policies are up to date and clear on where and how future users are to use these devices within the public right of way. Thus, a clear linkage between bike share/scooter share policies and the *Windsor TMP* bicycle network will be important.

DOCKED BIKE SHARE

The model of bike share that has been most prominent in the U.S. over the past decade is docked bike share. These services are typically sponsored through public agencies and administered by private providers. Bike share stations are positioned in areas most supportive of bicycling trips, like transit stops, employment centers, commercial districts and high-density residential areas. Access to bicycles is typically gained either through annual memberships or through an hourly charge.

While docked bike share systems experience high utilization in cities like Denver, Boulder and Fort Collins, they require significant public subsidies and require frequent system rebalancing due to stations either having no free docks to accept bicycles at the end of a trip or no bicycles available for users to take trips. The docked bike share model works well in areas of high residential and employment density where docks can be positioned relatively close to one another, and close to a high number of destinations, and allow for easy rebalancing. In Windsor, the current density would serve as a barrier

to achieving sustainable ridership and cost-effective operation of a system.

The TMP recommends not taking any significant action to implement a docked bike share system, but continuing public and stakeholder dialogue about docked bike share, especially in the wake of launching a regional transit system that will require first/last mile solutions.

DOCKLESS BIKE OR SCOOTER SHARE

An alternative to traditional docked bike share is dockless bikes that do not need to be parked in defined locations. Instead, dockless bike share systems provide a highly flexible alternative, allowing users to park bicycles at any public bike rack or on the sidewalk. Some providers also offer electric-assist bicycles. Common features of this model are the ability to rent bicycles by increments of time and to locate and unlock bicycles using smartphone apps.

The dockless bike share model is fundamentally different than docked bike share in that it is owned, operated and financially sustained primarily by private companies. There are a number of limitations as well as benefits for these models. Most notably, dockless bike share decreases the financial burden for the jurisdiction where bike share is offered, but also decreases the control the local jurisdiction has on the characteristics and deployment of these systems such as price, equitable distribution of bikes and management of bike supply.

Scooter sharing allows individuals to access scooters by downloading smartphone applications of companies that maintain a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types (e.g. seated, motorized Vespa scooters vs. standing, electric kick scooters). The scooter service provider typically provides battery charging by freelance individuals who collect scooters using their personal vehicles, charge the batteries at their home, and receive compensation from the scooter companies in exchange for their service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way.

The following considerations are important for determining whether any micromobility service is feasible:

- **Land use –** Dockless systems work best in areas of high-density development. Low-density, suburban, or rural areas tend to lack a sufficient population base and proximity of key destinations that would make the system attractive to users and financially viable for providers. This model requires a high density of bikes or scooters to be successful, to ensure that a user is within walking distance of a bike or scooter at any time within the service area. This would require companies to frequently circulate

bikes to more central locations or provide a high number of bikes, regardless of number of rides. Dockless systems could be popular within the small downtown core of Windsor but less utilized in the low-density areas around downtown. They will improve first/last mile travel as users can conveniently park close to their destination or have more flexibility in parking location, therefore shortening the overall travel time

- **Climate –** Dockless mobility options perform well in areas with mild to warmer climates and limited precipitation. While winters in Windsor may not be conducive to riding, the warm and dry climate throughout the spring, summer and fall months could make bike share a useful mobility option.
- **Safety –** Bike share system success is often contingent upon the presence of a well-connected and comfortable active transportation network. Bike share users are often individuals who cycle for some but not all trips, and therefore may be more selective about when to ride. Facilities like the Poudre River Trail attract riders, but areas of roadway that are missing low-stress and connected bicycle facilities would create challenges for users on bike share. Users will often ride on sidewalks when bike facilities are not present, creating a conflict with pedestrians.
- **Ridership base –** Micromobility providers tend to have more success in areas with shorter commute trips where workers can replace driving or transit trips with bike share. In addition, existing micromobility platforms are often popular among tourists. As shown in **Figure 4**, a small percent of people both live and work in Windsor, making micromobility not a viable option for commute trips. Electric devices do extend trip lengths beyond what is considered the current optimal bicycle distance of one to three miles.
- **Volatile industry-** If Windsor is looking for long-term sustainable solutions to providing active transportation through micromobility, then dockless bike share may present challenges. These systems are still nascent, funded by investors and navigating new regulations. Despite early successes, some providers have exited certain markets very quickly, and some early bike share companies, like Ofo, have ceased operations. Because jurisdictions and providers often don't have a contractual agreement; it makes it hard for users to change travel behavior and rely on them, or for local agencies to plan long-term investments and ensure a comprehensive landscape of transportation options. With that, there is a lower financial risk for the Town and agencies like GET, as these models are fully funded by the private operator

CONSIDERATIONS FOR REGULATING MICROMOBILITY VENDORS

Some early dockless e-bike and e-scooter providers launched their services without consulting local governments. At the time when these services were first launched, most cities did not have an official permit process established and there were no specific local guidelines. Several city agencies, such as San Francisco's Municipal Transportation Agency and Seattle's Department of Transportation have implemented short-term permits and pilot programs in response to these new mobility services.

Since dockless bike share companies are operated through private companies, jurisdictions should set regulations for these vendors in order to exhibit control over how these systems are operated. These regulations can ensure that privately owned bike share systems do not negatively impact other roadway users, are safe for its users, allow equitable access, and share the data generated with the jurisdiction to better inform transportation investments. The following list outlines categories of regulations that Windsor could put in place if micromobility providers enter the region.

- **Data-sharing requirements –** such as origin, destination, trip length, trip route, etc.
- **Equity issues –** for example, a certain percentage of scooters must be in underserved communities, low-income discounts should be provided and scooters for people with disabilities should be provided
- **Fees –** per operator and per scooter to regulate the number of scooters and companies present
- **Parking and rebalancing –** bikes or scooters illegally parked need to be moved within a certain amount of time

The TMP recommends not taking any significant action to implement a dockless bike/scooter share system, but continuing public and stakeholder dialogue about dockless bike/scooter share, and to establish an ordinance that regulates private providers in the distribution of small personal-mobility devices within Windsor.

CAR SHARE

Car sharing is a model for car rental, similar to bike share or scooter share, which allows users to pay for access to vehicles for limited periods of time. Car share systems tend to have vehicles dispersed throughout a service area, and can be reserved through a few clicks on a web page or smartphone app. The market viability of introducing car-share to Windsor will depend on the extent to which people can get around town by foot, bike and transit and therefore choose not to own a car. Communities with poor transit and limited walking and biking are not viable for car-share businesses to operate.

Although Windsor's land use and transportation network is not currently opportune for car share, Windsor can support car-share in the future by: permitting on-street parking; dedicating parking spaces for car-share providers; providing incentives

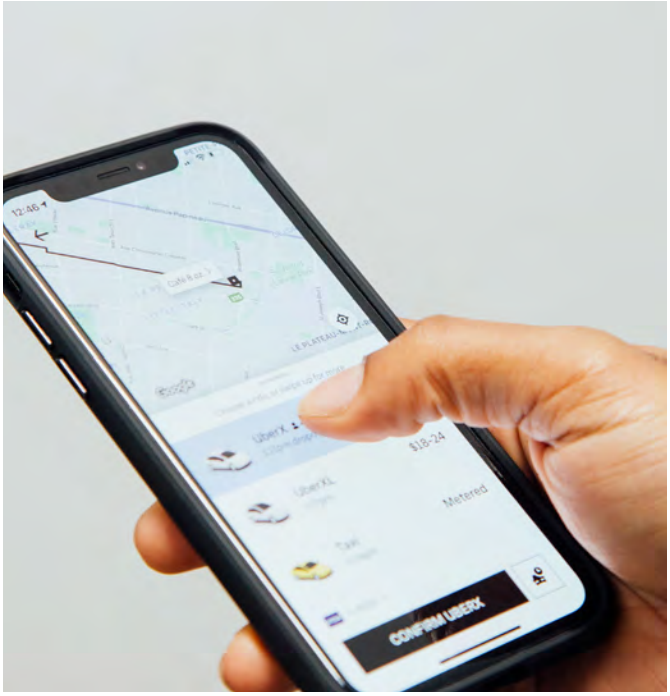
or requirements for new developments to provide car-share or dedicate space for car-share parking; and promoting and marketing this transportation option to residents and employees. During a stakeholder meeting, over half of attendees voted that Windsor should consider supporting car share but with minimal financial commitment.

The TMP recommends not taking any significant action to implement a car share program in Windsor, but continuing public and stakeholder dialogue about car share and to talk with potential private providers about the nature of a public private partnership.

RIDE-HAILING

Ride-hailing, provided primarily by Transportation Network Companies (TNC), i.e. Uber and Lyft, is a newer mobility service that has exploded in popularity over the past few years. At its most basic level, ride-hailing is simply the modern version of a taxi using a web-based platform that matches passengers with drivers in a simpler and more intuitive way. There are currently not ride-hailing providers consistently present in Windsor, but Uber and Lyft are present in the Northern Colorado region.

Nationally, TNCs/ride-hailing represent the fastest growing transportation mode. Overall, ride-hailing presents some mixed opportunities for Windsor. Ride-hailing provides a niche in the travel market for many trips: potential first/last mile access to new regional transit bus stops; social travel; and provides options for those who don't own an automobile. Ride-hailing also can help to reduce the risk of impaired driving by providing an easy way home for people who shouldn't be driving. Ride-hailing is not a viable transportation mode for some low-income households, outside of occasional/emergency use, so TNCs cannot be relied on consistently for basic transportation services, but serve as a valuable opportunity to expand the set of available transportation options for Windsor travelers. **Chapter 6** describes in greater detail the role that ride-hailing can play in Windsor in the short to medium-term.



ELECTRIC VEHICLES

Electric vehicle (EV) technology continues to advance at a rapid pace with increasing regulatory and financial incentives to encourage production and use at both the State and Federal level. The primary advantage at the jurisdiction-level includes reduced vehicle emissions. In addition, I-25 is a federally recognized alternative fuel corridor, where infrastructure upgrades are being made to support use of electric and other alternative fuel vehicles.

Windsor should continue planning for future EV integration by:

- Providing resources for promoting public awareness on EV benefits,
- Continuing to the provision of on-street and off-street EV parking and charging stations on public property
- Instituting incentives and requirements for the provision of EV charging stations and infrastructure by developers
- Transitioning the Town fleet vehicles to electric vehicles
- Revising building codes to incorporate EV charging into new developments
- incentivizing local residents to purchase EVs, and support EV drivers by adjusting their utility rate structures and increasing their access to renewable electricity
- Incorporating EVs into local planning efforts
- Advocating for EV adoption regionally

AUTONOMOUS AND CONNECTED VEHICLES

Autonomous and Connected Vehicles (AV/CV), are two vehicle technologies that are rapidly evolving with the potential to impact travel patterns and trip choices in the future. AVs are capable of sensing the environment and moving through the street network with little or no human input. CVs are vehicles that communicate with other vehicles on the road, as well as connected infrastructure, to improve roadway use and safety.

AVs may increase the demand for travel due to the decreased opportunity costs for travel and decrease the demand for parking. In addition, research on travel behaviors suggests that AVs may decrease transit usage except for high-frequency transit services like trains or bus rapid transit that operate on a dedicated facility. Some travel related to AVs has potential positive outcomes by providing elderly and youth populations with more mobility options and expected improvements in traffic safety.

Although this is a long-term shift, Windsor should begin to consider infrastructure and policies to support the positive opportunities AV/CV's offer. This includes:

- **Update design standards, policies and operational strategies to support and manage autonomous vehicles**
- **Ensure that autonomous and connected vehicles and infrastructure reduce travel time, support and encourage public transit, reduce greenhouse gas emissions (GHGs) and reduce low-occupancy trips during peak time**
- **Prioritize autonomous vehicles that are electrically powered, shared or operated as a fleet and by disincentivizing zero-occupancy vehicles**
- **Consider reducing minimum parking requirements in anticipation that AVs (and better transit service) will reduce the need for people to park at their final destination**
- **Monitor changes in connected vehicle technology.**

Additional policies for autonomous and connected vehicles are located in **Appendix G.**

MOBILITY AS A SERVICE

Mobility as a Service (MaaS) describes the shift away from privately owned automobiles and toward transportation that is offered as a service. This includes both public and private providers that can work together to provide a holistic landscape of transportation options either as a subscription or pay-as-you-go service. MaaS provides reliable and comprehensive transportation options and information that can reduce the reliance on or eliminate the need for private automobiles. The average car costs more than $8,800 per year to own and operate. By comparison, MaaS reduces costs for the user, decreases congestion, reduces emissions, increases efficient use of public infrastructure, and provides transportation providers with the data they need to be more cost-effective. MaaS can become increasingly appealing and viable through an integration of modes that includes payment integration, a trip-planning app and mobility hubs.

Windsor can encourage and facilitate MaaS by:

- **Require open data from private providers to facilitate trip planning. This includes providing trip planning information and trip costs in a way that can be easily aggregated by a third party;**
- **Create a platform for integrated payment that starts with GET and later expands to include private providers. Ultimately, Windsor may seek to require that third parties participate in an integrated payment system as a condition of operating in the Town; and**
- **Create public private partnerships where the Town promotes and supports the use private providers in Windsor to complement and supplement GET's regional public transit and any future transit providers. These partnerships can also help improve human service transportation provision.**
- **Larimer County and the North Front Range MPO are currently collaborating on establishing a One-Call/One-Click center (OCOCC) for connecting older adults and people with disabilities to transportation resources in the region. As part of this OCOCC, riders contacted the call center directly rather than individual ride providers to schedule rides. The providers had the opportunity to use ride management software and a call center to schedule and report on rides given. The Town of Windsor should leverage this program through education and marketing to its residents.**

11 | Implementation Roadmap

SUCCESSFULLY IMPLEMENTING THE TMP OVER THE NEXT DECADE WILL REQUIRE LEADERSHIP, PARTNERSHIPS, AND FISCALLY RESPONSIBLE BUDGETING.

All of this will rely on the goals and performance measures outlined in **Chapter 4**. The goals and performance measures provide a strategic and cost-effective investment framework to systematically build the multimodal network. It allows for responsible investments in Windsor's multimodal transportation system to meet safety and community livability goals where there is currently the greatest need, and then invest in the network to ensure all neighborhoods are connected. The goals and performance measures are intended to augment current and future capital project prioritization processes that take into consideration the mobility and safety needs of people who are traveling in Windsor.

PROJECT PRIORITIZATION

In order to determine which projects identified in **Chapter 5** (Pedestrian and Bicycle Network) and **Chapter 7** (Roadway Network) are implemented as funding becomes available, the TMP underwent a comprehensive community-based, data-driven approach to prioritizing recommended projects. The TMP performance measures provide the framework to strategically and cost-effectively implement multimodal projects and programs to meet the TMP goals. The performance measures are based on each of the TMP goals and prepared with input from the community, Town staff, and elected officials. They provide a method to select new projects and programs while also offering a set of measures to evaluate the TMP over the next five years, until the next TMP update. The performance measures will be used on an annual basis to ensure the TMP is making changes to the existing multimodal network, reflecting community preferences, integrating best practices for safe multimodal design, and embracing the use of new mobility technologies (see **Monitoring** section on **page 115**). The weights of each performance measure were also based in large part on community input, as shown in **Figure 53**.

This process is defensible by the Transportation Performance Management (TPM) program, as defined by the Federal Highway Administration (FHWA) in the Moving Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation (FAST) Act. FHWA defines TPM as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.

METHODOLOGY

The prioritization process considers how all recommended active transportation and roadway projects rank for four performance measures—safety, efficiency, increasing transportation options, and improving public health. Each project receives scores on all relevant performance measures; subscores are then multiplied by the weight of each performance measures, and those scores are summed for an overall project score. Projects are ranked based on the summed score.

Scores are determined based on project locations and the state of the land use, roadways, and crashes proximate to the proposed project; the scope of the project will be determined as a part of future analyses following the adoption of the TMP and during project study and planning. For example, a project with a high safety score, acknowledges that there are a high number of crashes within the project's influence area, but not necessarily that that project will provide safety countermeasures to address conditions that may be contributing factors to crashes. In the project analysis following the TMP, the scope of the project will be determined based on components such as crash patterns.

PERFORMANCE MEASURES

The following sections describe the methodology for scoring projects based on the following four performance measures:

1. Safety
2. Efficiency
3. Increases transportation options
4. Improves public health

SAFETY

Prioritizing projects that are proximate to high crash locations is an important way to prioritize projects that will improve the real and perceived safety for all users.

Projects were scored for the safety performance measure based on the number of severe injury and fatality crashes within a 150' buffer of a proposed project, normalized by the project length. Projects with a higher number of severe crashes within the defined buffer area received higher scores, with exact scores determined by natural breaks in the crash count calculation. In order to effectively weight bicycle/pedestrian-related crashes for active transportation projects, any crash involving a bicyclist or pedestrian was counted as two crashes. Crash records were analyzed from 2013 through 2017, the most recent complete five-year period for which records were available. The crash dataset includes all crashes that took place within the Town of Windsor or within a ¼-mile buffer around the town boundary.

EFFICIENCY

This measure addresses the extent to which a proposed project improves the efficiency of the transportation system; it addresses the increase in person throughput due to the proposed project. Active transportation projects were given a score for this performance measure based on the project type:

- Bike boulevards were given a score of 1 due to the sharing of space between bicyclists and vehicles
- Bike lanes and protected bike lanes were given a score of 2 due to the combination of dedicated space along corridors but mixing zones at intersections between bicyclists and vehicles
- Multi-use trail projects were given a score of 3 due to the dedicated space given to bicyclists

Roadway projects were given a score based on the volume to capacity (V/C) ratio of the corridor forecasted in 2040 according to the 2017 Roadway Improvement Plan. The V/C ratio determines the level of increased capacity captured by the roadway project.

- V/C ratio <.7= score of 3
- V/C ratio between .7 and 1 = score of 4
- New roadways or roadway projects with a V/C ratio >1 = score of 5

INCREASES TRANSPORTATION OPTIONS

This measure addresses how proximate a proposed project is to key destinations in order to represent

improved ability to access the most common destinations. Prioritizing access to these frequently visited destinations by vulnerable populations will expand the impact of transportation projects. Key destinations include parks, schools, trail access points, and transit stops; to determine a subscore for this category, an analysis was done to determine the total number of destinations within an 1/8 mile buffer of the proposed project, normalized for project length.

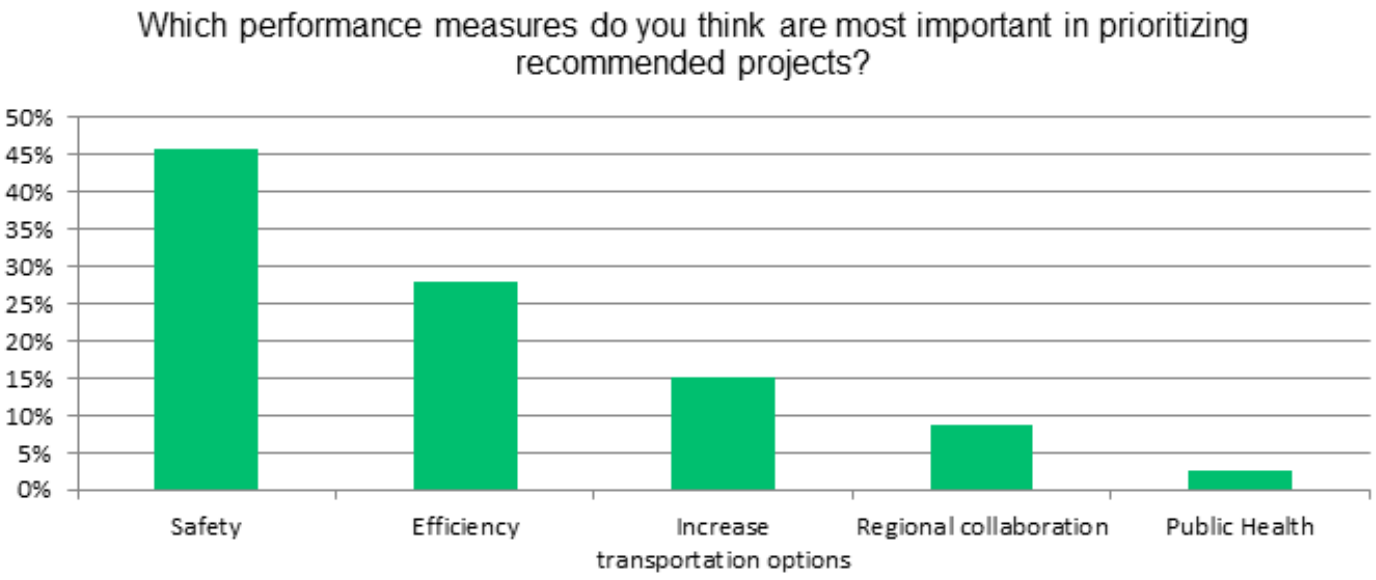
IMPROVES PUBLIC HEALTH

Improving public health is measured by the number of residents that a project will benefit. This spatial analysis used a shapefile of addresses within the Town of Windsor, last updated October 31, 2019 to serve as a proxy for population. The number of addresses within 1/8 mile of each proposed project was calculated and normalized by the length of the proposed project. Natural breaks were determined in this spread of address counts to assign a score 1 through 5 for each project. All roadway projects without a multimodal component were given a score of zero, due to their limited impacts on improving public health.

WEIGHTING

Weights for each performance measure were determined based on a combination of community input, best practice, and project team professional judgment. **Figure 53** shows the community's preferences for performance measures that should inform project prioritization. Regional collaboration ultimately was determined to be most appropriate as a qualitative factor to be determined upon project implementation, rather than a performance measure.

Figure 53: *Community response on priority performance measures*



The final weights that were determined are shown in **Table 5.**

Table 5: *Performance measure weights*

PERFORMANCE MEASURE	WEIGHT
Safety	3
Efficiency	2
Increase transportation options	2
Improve public health	1

Prioritization was done separately for each project type with the option to also see how a project ranks amongst all projects. Project types include:

- **Bike boulevards**- this includes bike facility treatments as well as the associated traffic calming necessary to reduce the posted speed limit from 30 mph to 25 mph
- **Bike lanes-** this includes protected bike lanes as well as bike lanes without a buffer
- **Multi-use trails-** this includes multi-use trails along new and existing roadways, as well as trails not immediately adjacent to roadways
- **Multimodal projects-** this includes corridors where there is both a recommended roadway and on or off-street bike facility project. Framing these as multimodal projects and pairing both recommendations will allow for a more cost-effective and streamlined approach to implementation
- **Roadways-** this includes the *Roadway Improvement Plan* recommendations, with updates made through the TMP process

The dynamic Excel-based prioritization tool is delivered as a part of the TMP. **Appendix H** include detailed instructions on how to apply this tool if the prioritization methodology or project list should change.

PRIORITIZATION OUTCOMES: INFRASTRUCTURE PROJECTS

Building and maintaining the multimodal network will require coordination between several departments, neighboring jurisdictions, private landowners, people who are building in Windsor, private businesses, CDOT, Larimer County, and Weld County. A group of Town staff from Public Works, Engineering, Planning, and Parks was organized during the TMP and should continue to meet quarterly to organize and maintain accountability for the implementation of the TMP; this group will be referred to as the Transportation Technical Committee (TTC). The TTC will provide on-going evaluation of the performance measures (see the Monitoring section on **page 115**) and identify opportunities for implementing new projects, policies, and programs while also ensuring that existing facilities are usable for generations to come. Multimodal quick win projects were identified through the TMP process; these projects were identified as high priority due to crash rates, community support, staff knowledge, and Town Board input. They are shown in **Table 6**. At the time of publication of the TMP, each of these projects was underway.

Table 6: *Multimodal quick win projects*

MULTIMODAL QUICK WIN PROJECTS			
PROJECT	**PLANNING LEVEL COST ESTIMATE**	**IMPLEMENTING AGENCIES**	**PROJECT DESCRIPTION**
7th Street Multimodal Corridor Improvements Study and 7th Street/Main Street Intersection Multimodal Safety Improvements Study	$225,000	CDOT and Weld County as possible funding partners	This project would study and plan multimodal improvements on 7th Street from the Greeley #2 Ditch Trail to the Poudre River Trail to improve safety, access, and comfort for people biking, walking and driving. This project would also study the intersection of Main Street and 7th Street with the planning and design of recommended improvements such as bulb-outs, signal timing changes, and medians to improve the safety of all users at the intersection.
Walnut Street Bikeway and Multimodal Corridor Study	$625,000		This project will determine and implement the appropriate low-stress bike/pedestrian facilities and multimodal safety improvements south of SH 392 from SH 257 to 15th Street.
Colorado Boulevard and SH 392 – Left Turn Treatment Analysis	$300,000	CDOT and Weld County as possible funding partners	In coordination with CDOT, this project would complete a northbound and southbound left turn treatment analysis.
7th Street and Riverplace Drive – Pedestrian crossing treatment	$125,000	CDOT and Weld County as project funding and technical partners	This project would examine the pedestrian and bicycle crossing across 7th Street at the intersection of Riverplace Drive and determine the appropriate crossing treatment to improve safety.
15th Street north of King Soopers – Multiuse Trail	$65,000		This project would fill in the gap in the pedestrian and bicycle network with a 10' wide trail on the west side of 15th Street between Cold Creek Drive and the #2 Ditch Trail.
TOTAL	**$1,340,000**		

The following tables (**Table 7 through Table 11**) outline high-priority multimodal projects and planning level cost estimates for the top tier projects in each project type category. **Appendix I** contains the full compiled list of all projects under each project type. Together, these projects provide a systematic and cost-effective approach to building and maintaining the multimodal network outlined in **Chapters 5, 6 and 7** over the next 20 years. The TTC will continue to add to this list of projects and prioritization according to the same methodology used in the TMP. Therefore, the prioritization as shown in tables in this chapter should be considered an initial guide for project development purposes that informs the overall strategy for completing the multimodal network over the next two decades. A specific project priority might change, but the overall approach and themes will likely remain consistent.

The planning level costs associated with each project are based on comparable projects in Windsor and other North Front Range Communities; cost methodologies are provided in detail following the tables. The TTC will continue to refine the planning level costs estimates as changes in labor, materials, and design fees occur over the next decade.

Table 7: *Bike boulevard projects*

TOP TIER BIKE BOULEVARD AND TRAFFIC CALMING PROJECTS			
PROJECT	**EXTENT**	**EXTENT**	**COST**
11th St	SH 392	Community Rec Center	$48,000
15th St	Fernwood Dr	SH 392	$134,000
7th St	Hemlock Dr	Eastman Park Dr	$50,000
13th St	SH 392	No. 2 Ditch Trail	$68,000
7th St	Main St	Elm St	$49,000

Table 8: *Bike lane projects*

TOP TIER BIKE LANE AND PROTECTED BIKE LANE PROJECTS			
PROJECT	**EXTENT**	**EXTENT**	**COST**
5th St	Main St	Walnut St	$9,000
5th St	Windsor Lake Trail	Main St	$8,000
3rd St	Walnut St	Elm St	$8,000
Walnut St	10th St	Chimney Park Dr	$81,000
Stone Mountain Dr	11th St	7th St	$54,000
Walnut St	Chimney Park Dr	SH 257	$31,000

Table 9: *Multi-use trail projects*

TOP TIER MULTI-USE TRAIL PROJECTS			
PROJECT	**EXTENT**	**EXTENT**	**COST**
SH 392	WCR 21	SH 257	$591,000
Eastman Park Dr	SH 257	Past Diamond Valley Dr	$1,159,000
West Ash St	7th St	11th St	$981,000
WCR 19	Sundance Dr	SH 392	$1,445,000
Eastman Park Dr	7th St	Cornerstone Dr	$2,858,000

Table 10: *Multimodal projects*

TOP TIER MULTIMODAL PROJECTS			
PROJECT	**EXTENT**	**EXTENT**	**COST**
SH 392	17th St	15th St	$815,000
15th St	WCR 68.5	WCR 70	$1,971,000
LCR 5	LCR 32E	SH 392	$1,969,000
SH 257	Crossroads Blvd	Eastman Park Dr	$3,316,000
SH 257	SH 392	WCR 70	$3,942,000
LCR 5	Highland Cove Dr	SH 392	$2,381,000
7th St	Eastman Park Dr	New Liberty Dr	$3,582,000

Table 11: *Roadway projects*

TOP TIER ROADWAY PROJECTS				
PROJECT	**EXTENT**	**EXTENT**	**RECOMMENDATION**	**COST**
SH 392	Westgate Dr	LCR 5	Widen to 4 lanes (rural)	$317,500
SH 392	17th St	3rd St	Study to Determine	$300,000
SH 257/WCR 19	Eastman Park Dr	Garden Dr	Widen to 4 Lanes (urban)	$1,585,000
Westgate Drive	SH 392	LCR 5/32e	New 2 Lane Urban Collector	$2,976,000
SH 392	I-25	Westgate Dr	Study to Determine	$50,000

The Town is currently working on the widening of SH 392 from 17th Street to WCR 13.

PLANNING LEVEL COST METHODOLOGY

The planning level cost estimates and assumptions for various bike facility types and roadway projects are identified in this section. Each cost estimate includes allowances for mobilization, traffic control, and contingency.

- Bike boulevard: $260,000/mile, including:
  - Removal and reset of some existing signs and installation of new signs
  - Removal of some existing lane lines
  - Installation of intermittent traffic calming features such as curb bump-outs, raised median crossings, and/or traffic circles
  - Minor inlet modifications at traffic calming features
  - Potholing for utilities
  - Installation of preformed thermoplastic pavement marking symbols
- Bike lane: $90,000/mile, including:
  - Removal and reset of some existing signs and installation of new signs
  - Removal of existing lane lines
  - Installation of epoxy pavement marking lines and preformed thermoplastic pavement marking symbols
- Protected bike lane: $240,000/mile, including:
  - Removal and reset of some existing signs and installation of new signs
  - Removal of existing lane lines
  - Installation of a buffered bike lane using epoxy pavement marking lines and flexible delineator posts
  - Installation of preformed thermoplastic pavement marking symbols
- Multi-use trail along existing roadway or greenbelt: $2,005,000/mile, including:
  - Clearing, grubbing, subgrade prep, embankment, and seeding for earthwork
  - Installation of a 12’ wide 6” concrete bike trail separated from the road
  - Minor drainage modifications
  - Potholing for utilities
  - Small retaining wall installations along 10% of the length of the trail to account for grading variation
  - Installation of epoxy pavement marking centerline and new signs
- Multi-use trail along proposed roadway project: $775,000/mile, including:
  - The *Roadway Improvement Plan (2017)* specified a 5-6’ sidewalk along their roadway expansion projects
  - This cost represents a full 12’ wide multi-use trail along one side of the roadway
- Multimodal projects
  - The cost of the bicycle/pedestrian and roadway components were summed to provide a conservative cost estimate. However, it is anticipated that there will be cost benefits associated with completing these projects concurrently, and the denoted cost will be higher than expected.
- Roadway projects
  - Per unit costs were applied directly from the Roadway Improvement Plan (2017)

PEDESTRIAN PROGRAM

The TMP proposes a Pedestrian Program (detailed on **page 38**) that dedicates annual funding to sidewalk gap completion, the rehabilitation of existing sidewalks, and the implementation of new, enhanced pedestrian crossings. These projects should be implemented on an ongoing basis. Project locations and priorities have been identified and prioritized in **Figure 24**. Dedicated funding amounts are outlined in this section.

SIDEWALK GAPS

The Town of Windsor's most recent data on sidewalk presence was used to determine an estimate of sidewalk gaps. Based on this data, there is an estimated 270 missing sidewalk segments, summing to 3.5 miles of missing sidewalks. The average length of a missing segment is approximately 70 linear feet. With a cost of $1,450,000 per mile ($275 per linear foot) for 5-foot wide sidewalk construction, it is estimated to cost $19,250 per missing segment of sidewalk; this amounts to a total cost of $5,200,000 to complete all missing sidewalks in the Town. The TMP applies a 20-year planning horizon to complete the missing sidewalks gaps. To fill in all sidewalk gaps by 2040, Windsor should complete 13 to 14 sidewalk gap segments (or 1,000 feet) per year. It will cost a total of $260,000 per year to complete missing segments at this rate. The Town should leverage funding from developers for the completion of sidewalks adjacent to development. The TMP assumes 1/3 of missing sidewalk links will be completed by development projects, and therefore will be at no cost to the Town of Windsor.

The Town of Windsor should dedicate $175,000 per year to complete about 1,000 feet of missing sidewalk gaps a year.

SIDEWALK AND CROSSING REHABILITATION

For the rehabilitation of existing sidewalks, there is currently no available data on the ADA compliance and widths of sidewalks and crossings.

Windsor should conduct an ADA Transition Plan in order to inventory the pedestrian network and identify the location and amount of insufficient or damaged sidewalks, curb ramps, and crossings.

An ADA Transition Plan is a formal document that is publicly available and outlined the Town's compliance with ADA standards for their public facilities, including sidewalks and crossings. These plans generally include: the persons responsible for coordinating ADA compliance, ADA public notice, procedure for resident to file complaints, procedure for public involvement, existing non-compliance areas, and an implementation program that includes

schedule and approach to removing previously outlined barriers. Additional guidance on developing an ADA Transition plan can be found here: https://www.adaactionguide.org/action-steps.

Because data was not currently available at the time of the TMP, the TMP assumes the annual cost of rehabilitation of existing sidewalks is 50% of the annual cost of new sidewalks ($260,000/year).

The Town of Windsor should dedicate $130,000 per year to rehabilitate existing sidewalks. This value should be updated once an inventory is complete to accurately reflect the quantity of insufficient sidewalks.

NEW PEDESTRIAN CROSSINGS

The TMP recommends applying the Town's Pedestrian Crossing Guidelines, to plan, design and implement three enhanced pedestrian crossings a year (including the two RRFBs implemented per year prior to the adoption of the TMP).

On average, it is estimated to cost the Town $50,000 per crossing, summing to $150,000 a year.

Table 12 shows the breakdown of annual costs for the Pedestrian Program that cumulatively amount to $500,000 per year for the next 20 years.

Table 12: *Pedestrian Program Costs*

PEDESTRIAN PROGRAM ANNUAL FUNDING	
PROJECT	**ANNUAL COST**
Sidewalk completion	$175,000
Rehabilitation of Existing Sidewalks	$130,000
Total (completion + rehabilitation)	**$305,000**
Pedestrian crossing implementation	$150,000
Part-time program management	$45,000
Annual Total	**$500,000**

2019 FUNDING OVERVIEW

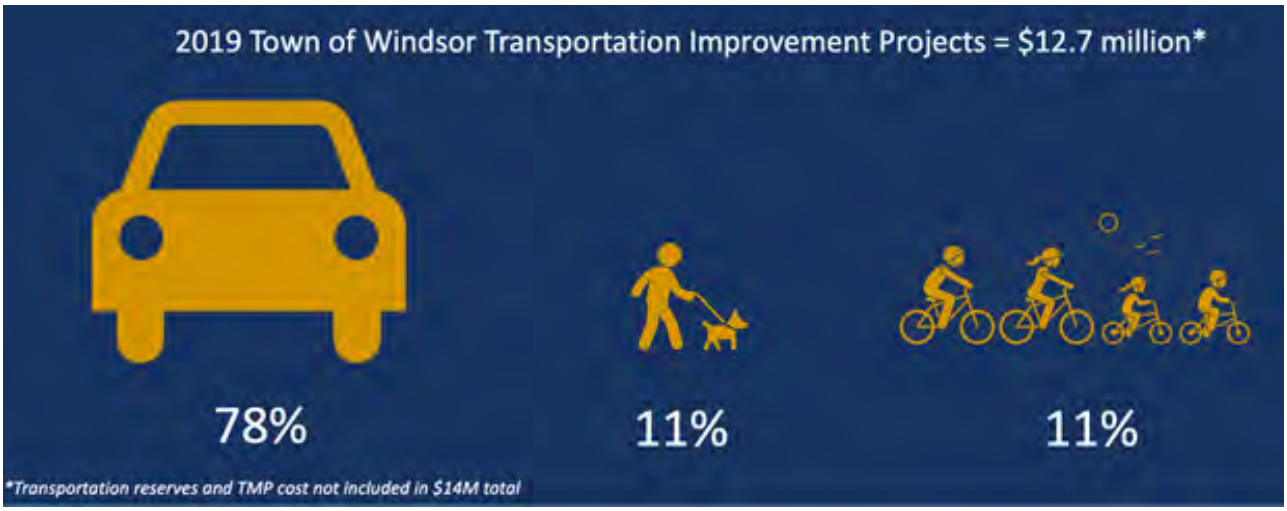
The following is an overview of the 2019 funding sources (shown in **Figure 54**) the Town of Windsor uses to operate, build, and maintain the transportation system. The information is from year 2019 budgeting and is subject to changes in the future. Additional details can be found in **Appendix A** (in the funding chapter beginning on **page 37**).

- The total public services budget to maintain and safely operate the Town's infrastructure is approximately $10 million. Approximately $8.5 of the $10 million is used to maintain and operate public streets.
- $34.7 million in capital funds are allocated for large, one-time purchases of land, buildings, improvements, distribution and collection systems, equipment and infrastructure. Approximately $14 of the $34.7 million is used for transportation projects.
- The total expenditures to provide general parks and trails maintenance, new park construction, forestry services, and recreational activities is $8.8 million. Approximately $1.2 of the $8.8 million is used to maintain and construct new trails. Trail maintenance requires approximately 70% of the $1.2 million funding.
- The North Front Range Metropolitan Planning Organization (NFRMPO) will provide approximately $11.2 million in grant funding for transportation projects in Windsor from year 2019 to 2022.
- Approximately $24 million is used to operate, maintain and build the transportation system in Windsor. That equates to approximately $275 per resident a year for operations/maintenance and $420 per resident for capital projects.

Figure 54: *Summary of 2019 transportation budget and costs*

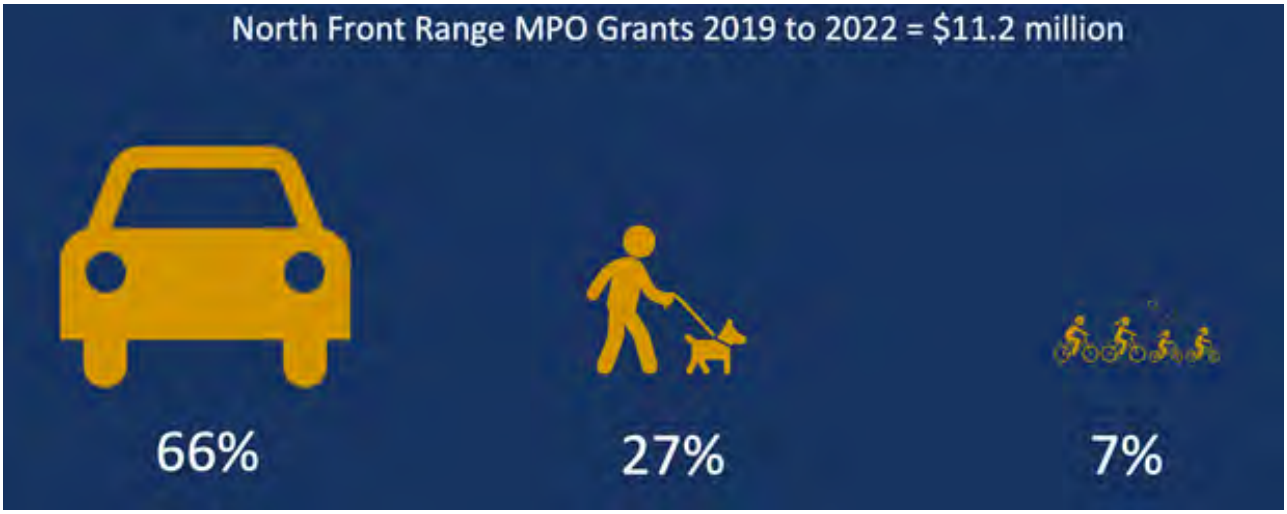
The Town of Windsor's current budgeting process includes a five-year Capital Improvement Plan (CIP). The CIP has detailed cost estimates and commitments for funding based on forecasted revenues. The approved first-year projects of the CIP are funded into 2023. Projects planned in the next four years (2020-2023) are approved by Town Board in concept only. Ongoing projects are placed in the five-year CIP and reviewed annually. The CIP is updated annually to address specific needs as they arise, or as Town Board goals and policies change.

Figure 55: *Breakdown of 2019 Town of Windsor transportation funding by transportation mode*



It is important to note that completion of the multimodal network might only be possible if new financial resources or grants become available. Most funding sources are for capital projects and do not provide funding for on-going maintenance. The community, staff, and elected officials could face a need in coming years for new local funding sources to complete and maintain the multimodal network in this TMP. A summary of how funding from the North Front Range Metropolitan Planning Organization (NFRMPO) is shown in **Figure 56**.

Figure 56: *Breakdown of 2019 to 2022 NFRMPO grant funding by transportation mode*



FUTURE FUNDING BREAKDOWN

The proposed projects and programs in the TMP are to be implemented over the next 20 years. **Table 13** shows the breakdown of the costs by project type, over the 20-year buildout and each year. All costs are shown in 2019 dollars and will need to be updated each year for inflation. It is assumed that funding will increase proportionally with cost increases due to inflation, resulting in an annual funding breakdown similar to what is shown in **Table 13**.

The funding amount denoted by each line in Table 13 will be used to go down the project lists organized by project type identified in Table 7 through Table 11 (top tier projects) and Appendix I (complete project list) in order to identify which projects should be implemented first.

- **Bike boulevards-** The total cost of implementing all of the proposed bike boulevards was divided across the 20-year planning horizon
- **Bike lanes-** The total cost of implementing all of the proposed bike lanes and protected bike lanes was divided across the 20-year planning horizon
- **Multi-use trails-** It is assumed that on average, 30% of the cost of trails is paid for by the Town, with 70% being paid for by the developer. The developer share can range from 70-80%, but the TMP assumes a conservative estimate. Thus, 30% of the total cost of implementing all of the proposed trail projects was divided across the 20-year planning horizon
- **Multimodal: multi-use trail component-** On average, the trails component of multimodal projects is about 20% of the total cost. It is also assumed that on average, 30% of the cost of trails is paid for by the Town, with 70% being paid for by the developer. The developer share can range from 70-80%, but the TMP assumes a conservative estimate. Thus, 20% of 30% of the cost of implementing all of the multimodal projects was divided across the 20-year planning horizon.
- **Multimodal: roadway component-** On average, the vehicular component of multimodal projects is about 80% of the total cost. Thus, 80% of the cost of implementing all of the multimodal projects was divided across the 20-year planning horizon.
- **Roadway-** The total cost of implementing all of the proposed roadway projects (that do not have an adjacent multimodal component) was divided across the 20-year planning horizon

- **Pedestrian program-** Per **Table 13**, Windsor should invest $500,000 per year on the Pedestrian Program, which consists of sidewalk and crossing investments only (not trails)
- **Vehicular maintenance and operations-** Maintenance is expected to increase from 2019 dollars as the roadway system expands. The TMP assumes a conservative estimate of a 20% increase from the 2019 $8.5 M line item for maintenance and operation. The next few years may see a smaller increase in maintenance, ultimately compounding to a 20% increase over the next 20 years.
- **Trail maintenance-** Trail maintenance is expected to increase from 2019 dollars as the trail network expands. The TMP assumes a conservative estimate of a 15% increase from the 2019 $840,000 line item for trail maintenance. The next few years may see a smaller increase in maintenance, ultimately compounding to a 20% increase over the next 20 years.
- **Program implementation-** Windsor should invest about $500,000 a year in programs such as transportation demand management, Safe Routes to School, and emerging mobility. Many of these programs can be funded by outside funding sources such as grants, or completed with in-house resources.

Table 13: *Future transportation costs by project type*

PROJECT TYPE		TOTAL COST (20 YEAR HORIZON)	PER YEAR COST (2019 DOLLARS)
New Projects	Bike boulevards	$2,394,600	$119,730
	Bike lanes	$1,186,000	$59,300
	Trails	$42,329,100	$2,116,455
	Multimodal: trail component	$5,607,865	$280,393
	Multimodal: roadway component	$74,771,534	$3,738,577
	Roadway	$51,391,500	$2,615,575
	Pedestrian program	$10,000,000	$500,000
Maintenance	Vehicular maintenance and operations	$204,000,000	$10,200,000
	Trail maintenance	$19,320,000	$966,000
Programs	Program implementation	$10,000,000	$500,000
	TOTAL	**$421,000,599**	**$21,050,030**

The various costs from **Table 13** are aggregated based on mode and shown in **Table 14** with the percent of total funding dedicated to each mode. The color coding shows the connection between project types that were summed in **Table 13** to derive the values in **Table 14**.

Table 14: *Future transportation costs by mode*

MODE	TOTAL COST (20 YEAR HORIZON)	PER YEAR COST (2019 DOLLARS)	PERCENT OF TOTAL FUNDING
Vehicular	$330,163,034	$16,508,152	78%
On-street Bike Facilities	$22,273,483	$179,030	1%
Pedestrian Network (sidewalks + crossings)	$10,000,000	$500,000	2%
Trails	$67,256,965	$3,362,848	16%
Programs	$10,000,000	$500,000	2%
TOTAL	**$421,000,599**	**$21,050,030**	**100%**

TMP IMPLEMENTATION ROADMAP

Achieving the safety and mobility goals of the TMP will require ongoing funding for project implementation over the next decade. An emphasis on funding and building the multimodal transportation network over the next five years will be critical to slow the rate of crashes, accommodate the changing travel needs of new business and residents, and maintain economic vitality. Over the next five years the following are steps that should be taken by staff, the community, and elected officials.

ACTION #1: PURSUE NEW INTERNAL AND EXTERNAL FUNDING SOURCES

Additional local funding will be required to maintain older transportation infrastructure that will be passed on to future generations.

The Transportation Technical Committee (TTC) will form a working group with residents and business to gauge support and leadership for new funding sources that would require voter approval.

A list of the current funding sources and possible new external funding sources for projects is outlined in this section.

Current taxes used to fund transportation operations and capital projects:

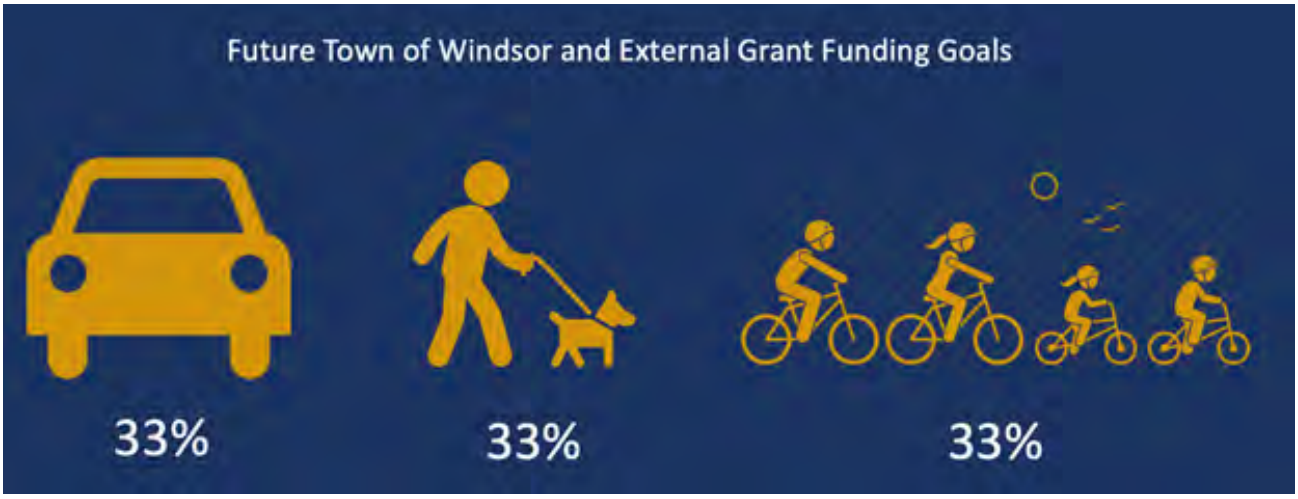
- Town of Windsor sales and property tax
- Weld County property tax
- Combined Weld County and State of Colorado sales tax
- State of Colorado and Weld County motor vehicle registration taxes and fees

It will be critical for the TTC to expand the use of grant funding through additional resources and to strategically consider the best opportunities for the investment in completing grant applications.

A critical step in obtaining external grants is having a TMP and project priorities that are supported by the community and elected officials. Almost all of the projects in this TMP could be a grant funded project. It will be critical to have the projects "shovel ready" so that the funding can be used for implementation. In most cases the list of external funding sources require local matching funds up to 30%.

- USDOT BUILD grant program (formerly TIGER)
- NFRMPO Transportation Improvement Program (TIP)
- NFRMPO Congestion Mitigation and Air Quality improvement Program (CMAQ)
- NFRMPO Surface Transportation Block Grants
- CDOT/NFRMOP Transportation Alternatives (TA)
- CDOT State Multimodal Transportation Options Fund (TO)
- CCOT Safe Routes to School (SRTS)
- FHWA/CDOT Safety Improvement Program (SIP)

Figure 57: *Future Town of Windsor and external grant funding goals*



Identifying relevant and new funding sources is essential to ensuring that the project list identified in the TMP can come to fruition. Although projects are prioritized as a part of this plan, this prioritization should maintain a level of flexibility. If a funding source becomes available that is geared towards a certain project type or location, the Town has the ability to modify the prioritization list in order to leverage this opportunity. For example, if the transportation impact fees associated with a new development can be used towards a specific project, that should be considered in tandem with the prioritization rank of that project.

ACTION #2: PHASE PROJECTS WHERE POSSIBLE

Although projects are listed in this plan as one project, the Town should consider the phasing of projects, as appropriate. This means that projects can be completed for part of the defined extent or only including part of project description, if deemed appropriate. This desire to implement projects in a phased approach may arise if there are opportunities through partnerships, funding sources, repaving schedule or changes in project needs. For example, a grant specific for active transportation may fund the bicycle and pedestrian components of a multimodal project but not the roadway components.

ACTION #3: PARTNER WITH NEW DEVELOPMENT TO IMPLEMENT MULTIMODAL NETWORK

Given the number of neighboring jurisdictions and governing bodies in the northern Colorado region, coordinating between and within various municipalities and departments is especially important. Ensuring the right stakeholders are at the table during the planning and design phases of a project will be important to ensure: the project scope encompasses the needs of all users; all available funding sources are being leveraged; and project implementation is coordinated with other related efforts. Coordinating within a municipality is equally as important. For example, if a proposed project includes restriping a roadway to add bike lanes, being aware of the repaving schedule will allow the leveraging of funds to implement the bike lane project in a much more cost-effective manner.

Over the next five years, on-going development in the Town of Windsor will present opportunities to co-fund multimodal transportation projects. Some of the projects might be in new development areas that allow the Town of Windsor to complete missing trail links, or in existing areas where upgrades to existing infrastructure allow for new multimodal enhancements.

Implementation of trail projects provides an opportunity for the private sector to make financial contributions toward the completion of the multimodal network identified in the TMP. In order to maximize the benefit of the contributions, it might be necessary for the Town to set aside funding to ensure that any privately funded multimodal projects can be properly connected to the existing network.

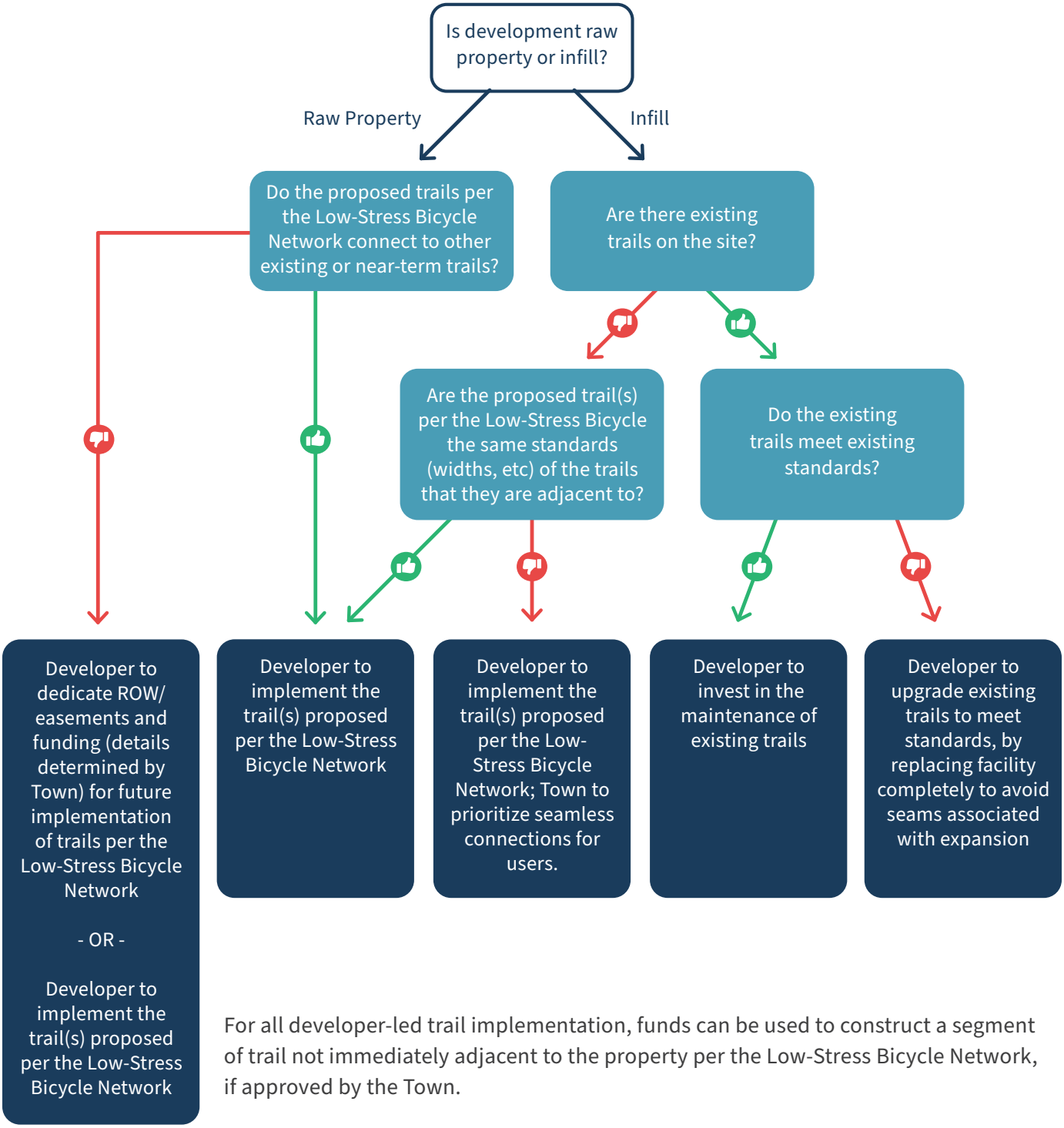
Examples would be when a private development funds on-site trail projects but there is a missing link to the existing network beyond their property limits. Likewise, new traffic or HAWK signals might be funded entirely by a private development, but additional multimodal connections beyond the development might now be possible and could be cost effectively built in conjunction with the new intersection. The funding for this action is not intended to reduce private development costs. It is intended to leverage their improvements to reduce the overall costs of building the multimodal network identified in the TMP.

ACTION #4: IMPLEMENT AND BUILD ON THE 2019 COMPLETE STREETS STANDARDS UPDATES

Building complete streets will require a mix of retrofitting existing streets and using revised street standards in new developments. Retrofitting existing streets will rely on neighborhood outreach, best practices from street transformation projects around Colorado and Capital Improvement Plan funding. These projects will take many years to complete and will be prioritized based on crash data and neighborhood needs. It may be necessary to have pilot projects and collect data to build support for the retrofit complete street projects.

The TTC should build on and implement the 2019 street standards update. Continued updates to the street standards will be established with an emphasis on 25 mph travel speeds, and continue to emphasize multimodal connections and enhanced streets that provide character and economic integrity for neighborhoods.

The standards will reduce the need for future Town of Windsor traffic calming funding by establishing design standards and features that developers will build when constructing new streets in greenfield developments.



For all developer-led trail implementation, funds can be used to construct a segment of trail not immediately adjacent to the property per the Low-Stress Bicycle Network, if approved by the Town.

MONITORING

Monitoring Windsor in achieving the TMP's goals is an important way of evaluating current success, modifying the path forward, and building momentum and support within the community. **Table 15** lists each of the seven transportation goals and performance measures for each goal.

This monitoring table should be completed by the TTC on an annual basis.

Performance measures are intended to track the effectiveness of the implementation of recommendations towards the Town's goals introduced in **Chapter 4**. These performance measures also will enable Town staff to communicate outcomes of the transportation system changes in future years, and can be used on a continuous basis for evaluation of the proposed recommendations. The details of each goal include the following:

- Performance Measure: quantifiable approach to measuring the status and progress of a goal
- Possible Data Sources: lists the possible sources for the pieces of raw data
- Recommended Threshold: adds a threshold for success if applicable and additional information for how to track a given metric over time

Table 15: *Monitoring*

GOAL	PERFORMANCE MEASURE	POSSIBLE DATA SOURCE(S)	RECOMMENDED THRESHOLD	2020	2021	BEYOND...
SAFETY	Reduction in the annual crash rate (number of crashes/ volume)	-Geocoded crash data (CDOT and Windsor Police Department) -per Million entering vehicles	The threshold will be relative to existing conditions.			
	Reduction in the number of fatal crashes		Windsor should have a goal of zero traffic-related fatalities per year.			
EFFICIENCY	Travel time on SH 392 from CR 15 to SH 257 EB (minutes/mile)	-Blue Toad -Streetlight, with Trip Attributes -Inrix	Travel time can be measured and tracked over time. The threshold for various segments will be relative to existing conditions. Travel time statistics can be disaggregated by 15 minute time periods.			
	Travel time on SH 392 from CR 15 to SH 257 EB (minutes/mile)					
	Travel time on SH 392 from SH 257 to Hollister Lake Road EB (minutes/mile)					
	Travel time on SH 392 from SH 257 to Hollister Lake Road WB (minutes/mile)					
	Travel time on SH 257 from SH 392 to Crossroads Boulevard EB (minutes/mile)					
	Travel time on SH 257 from SH 392 to Crossroads Boulevard WB (minutes/mile)					
PUBLIC HEALTH	Number of households within ¼ mile of a low-stress bicycle facility, as identified in the TMP bicycle network	Spatial analysis comparing address shapefile applied to low-stress bike facility shapefile	A threshold can be set to determine the ideal proportion of people who have access to pedestrian and bicycle facilities. This percent should increase over time.			

GOAL	PERFORMANCE MEASURE	POSSIBLE DATA SOURCE(S)	RECOMMENDED THRESHOLD	2020	2021	BEYOND...
TRANS-PORTATION OPTIONS	Miles of complete low-stress bicycle facilities		There are 41 miles of existing bicycle facilities, and 105 miles in the complete bicycle network. Each year should implement about three miles of bike facilities a year.			
	Percent of roadways with complete sidewalk	Public Works should inventory the sidewalk network for completion, ADA compliance, and meeting standards	Implement about 900 to 1,000 feet of new sidewalks a year			
REGIONAL COLLABO-RATION	Number of implemented multimodal projects that connect Windsor to adjacent communities		Aim to implement at least one project a year that provides access regionally			
	Number of implemented projects that leverage local funding with regional partners		Aim to implement at least two project a year that collaborate with regional partners			
MAINTE-NANCE	Pavement Condition Index (PCI)	Per determination by the Public Works Department [1]	Keep the road-way network at the targeted av-erage PCI rating of 75 to 80			
	Prioritized plowing sidewalks and bike facilities	Per determination by the Public Works Department	Self-assessment of achievement of TMP recom-mendations on plowing			

GOAL	PERFORMANCE MEASURE	POSSIBLE DATA SOURCE(S)	RECOMMENDED THRESHOLD	2020	2021	BEYOND...
FISCAL RESPONSI-BILITY	Distribution of annual capital expenditure between walking, biking and driving	Assessment per Finance Department	The threshold will be relative to existing conditions, with an increase in percent of funds dedicated for walking and biking.			
	Quantity of external funds acquired	Assessment per Finance Department	The threshold will be relative to existing conditions, with an increase in percent of funds coming from external sources.			

[1] https://www.fhwa.dot.gov/pavement/ management/qm/data_qm_guide.pdf