Presented To:

City of Fort Collins

Presented By:

FEHR PEERS

Corridor Understanding Report

November 2015

West Elizabeth Enhanced Travel Corridor Plan

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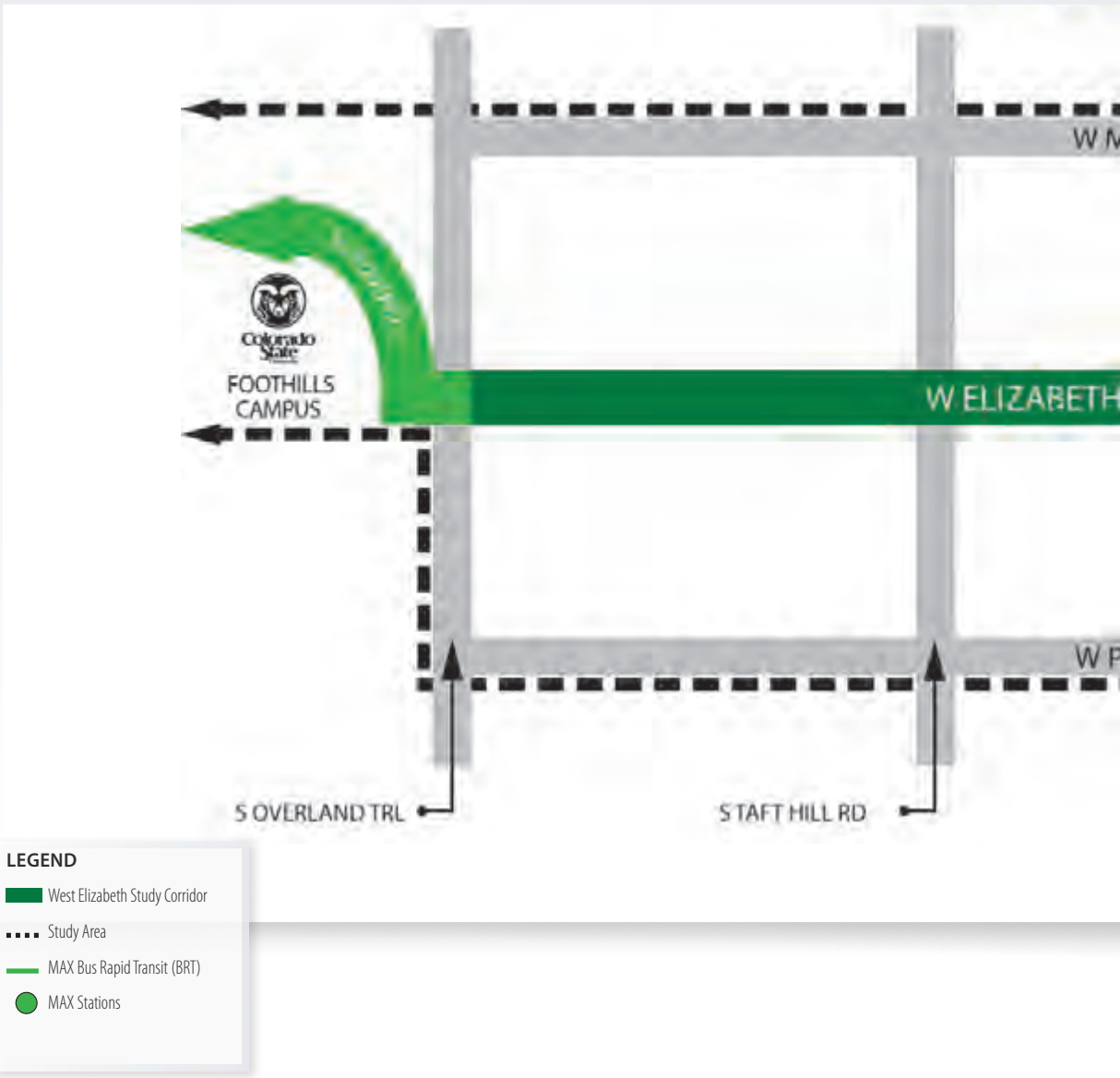
EASTBOUND
Bigger salads.
Even bigger
smiles.
McALISTER'S

EXECUTIVE SUMMARY

THE WEST ELIZABETH ENHANCED TRAVEL CORRIDOR PLAN WILL PROVIDE A ROAD MAP FOR BOTH SHORT-TERM RECOMMENDATIONS AND A LONG-TERM VISION FOR THE CORRIDOR BASED ON AN UNDERSTANDING OF THE TRANSPORTATION AND LAND USE NEEDS OF THE AREA.

ENHANCED TRAVEL CORRIDORS (ETCs) are defined by the City's Transportation Master Plan (TMP) as corridors that emphasize high-frequency transit, bicycling and walking. This Corridor Understanding Report documents the West Elizabeth Corridor's history and context, previous planning that has influenced the corridor, and existing conditions of the corridor's infrastructure and performance for different modes of transportation. Future steps of the West Elizabeth Enhanced Travel Corridor Plan development process will build upon the Corridor Understanding Report: developing a Purpose and Need Statement and Corridor Vision, developing and evaluating alternative improvement scenarios, and developing a preferred alternative, with both near-term and longer-term implementation recommendations.

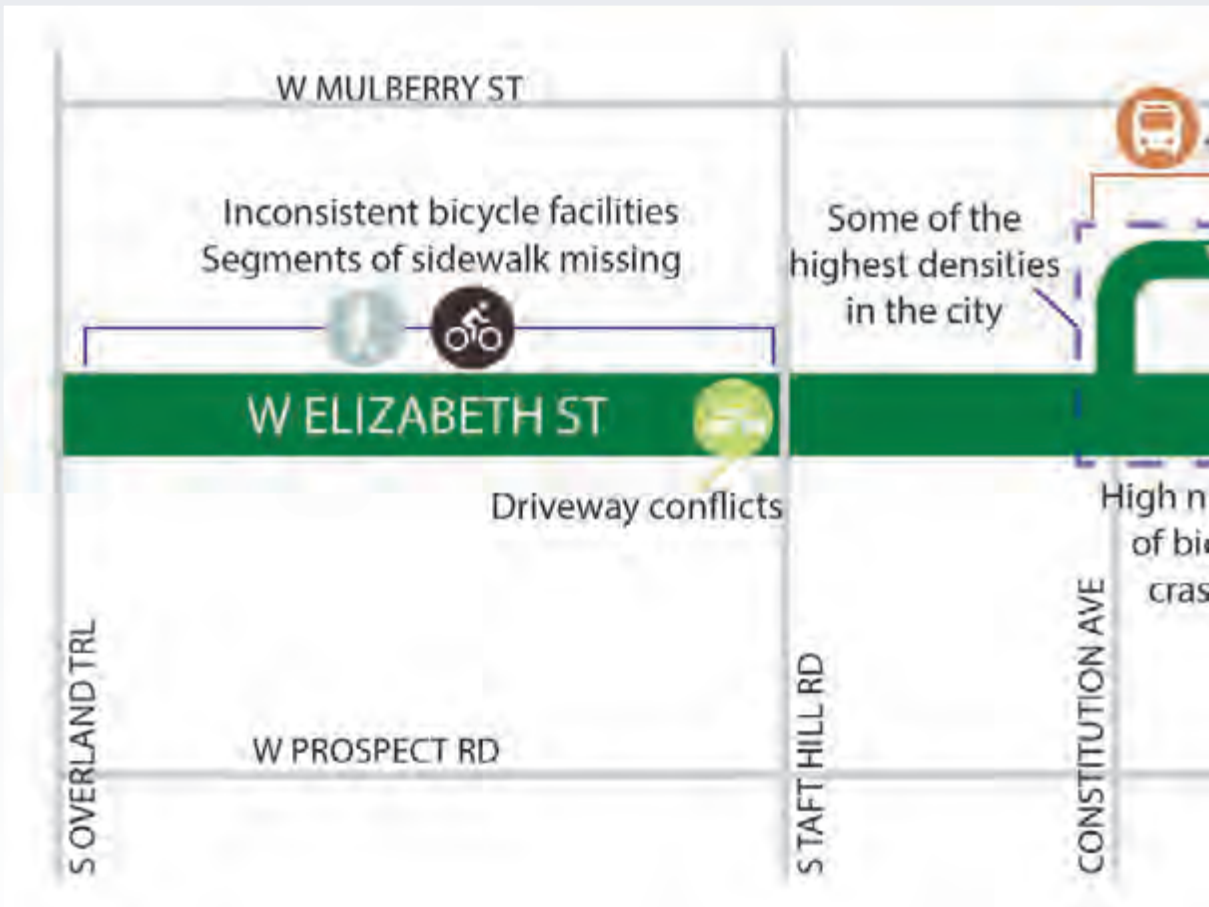
STUDY AREA

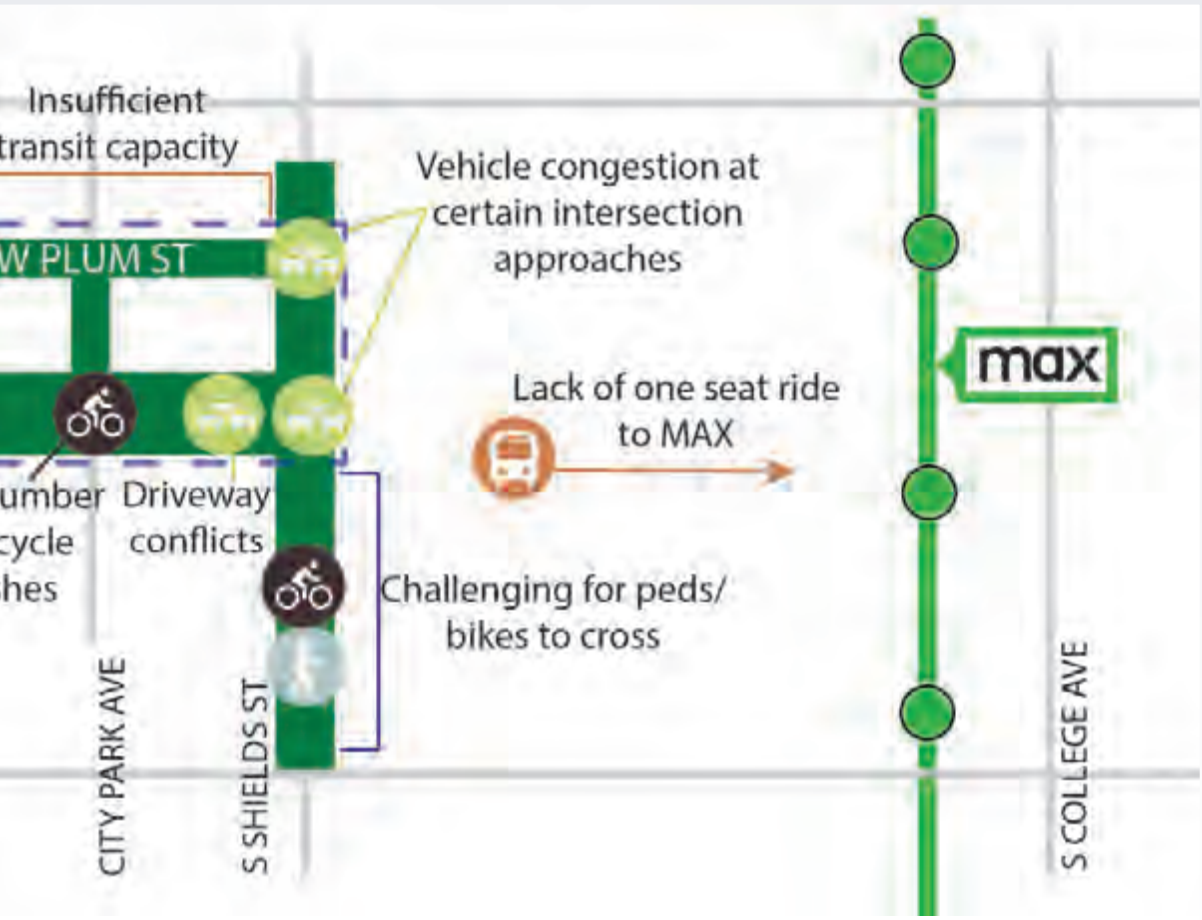

FOOTHILLS
CAMPUS
W ELIZABETH
S OVERLAND TRL
S TAFT HILL RD
LEGEND
West Elizabeth Study Corridor
Study Area
MAX Bus Rapid Transit (BRT)
MAX Stations

The West Elizabeth ETC focuses on West Elizabeth Street between Overland Trail and Shields Street, as well as segments of Plum Street, Constitution Avenue, and City Park Avenue. The study area also includes the surrounding network, and the plan will look at how this corridor connects with the CSU campuses and the rest of the community.

WEST ELIZABETH CORRIDOR

SUMMARY OF KEY ISSUES




Insufficient
transit capacity
W PLUM ST
Vehicle congestion at
certain intersection
approaches
max
Lack of one seat ride
to MAX
umber
cycle
hes
Driveway
conflicts
Challenging for peds/
bikes to cross
CITY PARK AVE
S SHIELDS ST
S COLLEGE AVE

EXECUTIVE SUMMARY

1»LAND USE

Land use on the West Elizabeth Corridor includes a mix of types and densities of development, including multi-family, single family, as well as commercial parcels near the West Elizabeth Street/Shields Street and West Elizabeth Street/Taft Hill Road intersections. Land use surrounding the Campus West area has **some of the highest densities allowed in the city,** including dense multi-family housing on Plum Street affiliated with Colorado State University. A large proportion of the study area's residents are renters, many of whom are CSU students.

2»RIGHT-OF-WAY

Right-of-way on the corridor **varies from 60 to 100 feet** between Shields Street and Overland Trail.

3»CROSS SECTIONS

West Elizabeth Street's cross section includes **two to four travel lanes** between Shields Street and Overland Trail. Near Shields Street, West Elizabeth Street has four travel lanes (two in each direction) with a two-way left-turn lane. West of Skyline Drive, West Elizabeth Street has two travel lanes with a two-way left-turn lane. West of Kimball Drive, West Elizabeth Street has two travel lanes.

4»TRAVEL DEMAND

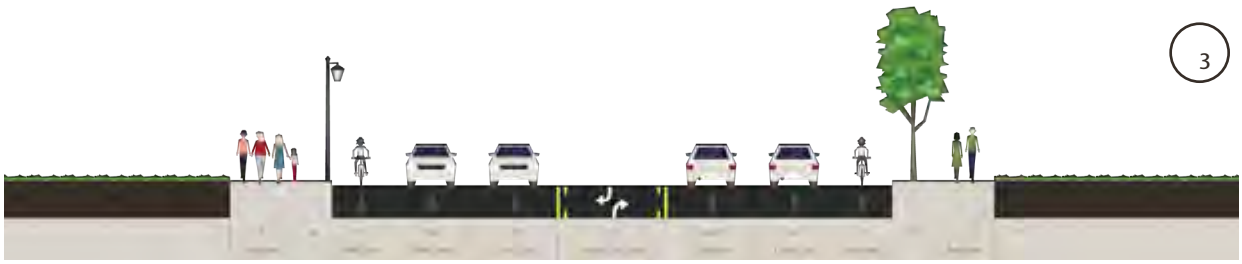
The amount of traffic on West Elizabeth Street generally increases from west to east. Near Timber Lane the Average Daily Traffic (ADT) is 4,400 vehicles per day and near Shields Street the ADT is over 18,000 vehicles per day. West Elizabeth Street also carries a large number of transit passengers, bicyclists and pedestrians. **Transfort routes in the study area have an average weekday ridership of almost 5,000 passengers per day.** Over 2,000 bicyclists per day use West Elizabeth Street west of Shields Street and over 100 pedestrian crossings occur during peak hours at Shields Street/West Elizabeth Street, City Park Avenue/West Elizabeth Street and Plum Street/Shields Street intersections. **Furthermore, the Plum Street/Shields Street intersection has the largest number of transit passengers, bicyclists and pedestrians in the study area.**

5» VEHICLE OPERATIONS

Analysis shows that most study intersections operate at an acceptable vehicle level of service (LOS), a measure of average vehicle delay, during peak hours. **However, key approaches to certain intersections experience notable congestion:** the northbound left-turn, eastbound left-turn, and eastbound right-turn at the West Elizabeth Street/Shields Street intersection and the eastbound and westbound movements at the Plum Street/Shields Street intersection.


WHICH WAY
1


2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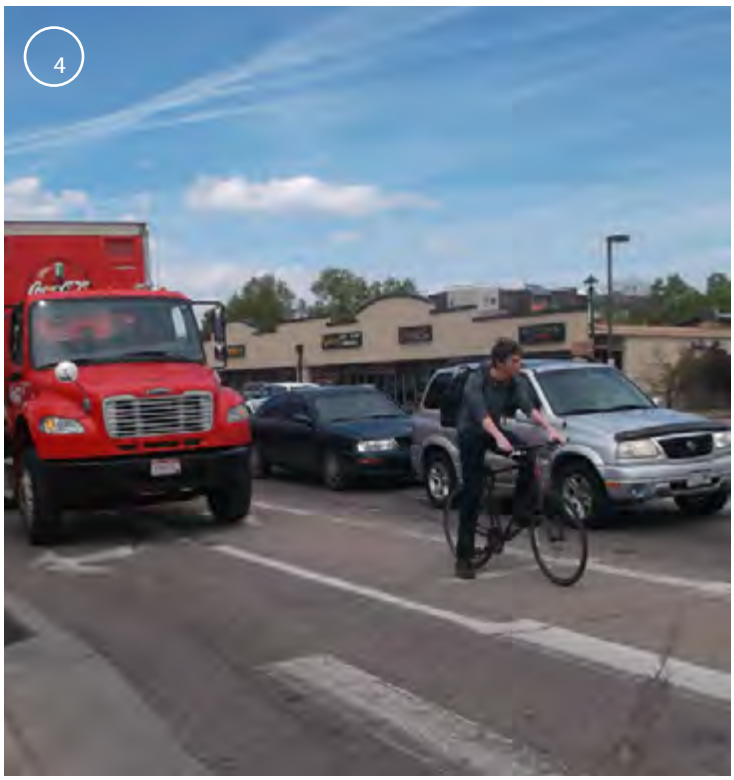

4


5


31
6

This Corridor Understanding Report documents the West Elizabeth Corridor's history and context, previous planning that has influenced the corridor, and existing conditions of the corridor's infrastructure and performance for different modes of transportation.

6 » TRANSIT

Several Transfort bus routes serve the study area, the majority of which connect to the CSU Transit Center. Route 31, which connects West Elizabeth Street and Plum Street to the CSU Transit Center, runs every 10 minutes. The HORN and MAX also run every 10 minutes. Most other routes operate every 30 minutes. **Transfort ridership in the area is generally high. In fact, ridership is so high on some routes bound for CSU that drivers regularly have to turn away passengers because the buses are full, even with the addition of trailer buses during peak hours.** Top ridership stops in the study area include the CSU Transit Center, stops along Plum Street, Constitution Avenue between Shields Street and West Elizabeth Street, and stops on West Elizabeth Street just west of Taft Hill Road. Some of the study area's routes, including Route 31, Route 32, and Route 2, have a high productivity as measured by weekday passengers per revenue hour and weekday passengers per revenue mile.

7 » PEDESTRIANS

For pedestrians, a variety of sidewalk conditions exist on the corridor. Some sidewalks are attached, some are detached, and **there are many locations where no sidewalk exists or sidewalk width is too narrow for people using mobility devices.** In addition to marked crossings at signalized intersections, there are two midblock crossings on the corridor: one west of Shields Street and another west of Skyline Drive. Pedestrian delay at signalized intersections is relatively high at most study intersections during peak hours. **Significant lengths of West Elizabeth Street have a low pedestrian level of service, a measurement of the quality of the pedestrian environment that accounts for sidewalk presence and width as well as other amenities.**

8 » BICYCLISTS

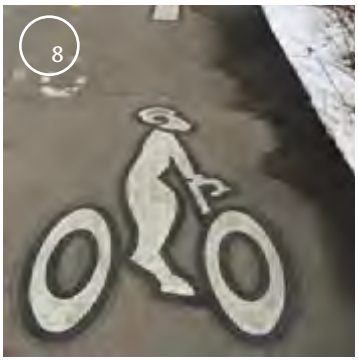
Bike lanes are provided along the majority of the corridor, but are missing from key segments of West Elizabeth Street, including several segments west of Taft Hill Road. Most of the corridor is sufficiently comfortable for the many residents and college students who currently ride on West Elizabeth Street. However, these segments are generally not comfortable for lower-confidence adults/college students as well as children.

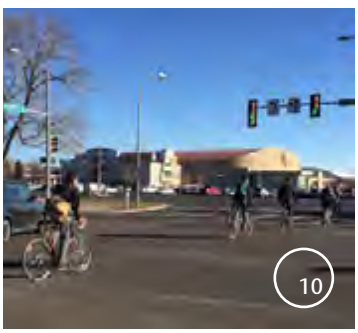
9» SAFETY

The study area has some intersections and roadway segments with a higher than expected number of crashes. For example, the West Elizabeth Street/Shields Street intersection has more crashes than expected compared to similar locations, and the West Elizabeth Street/City Park Avenue intersection has more bicyclist-vehicle crashes than expected compared to similar locations. West Elizabeth Street between Shields Street and City Park Avenue also has more crashes than expected compared to similar locations.

10» DELAY BY MODE

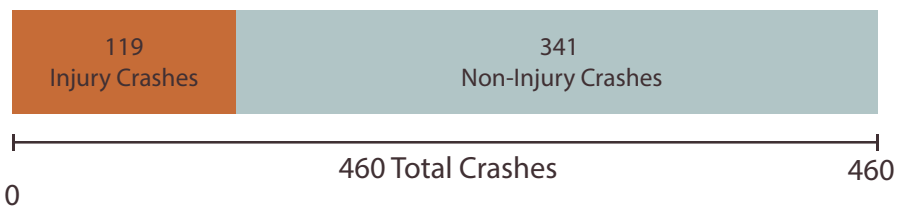
Over half of the users at the intersection of Shields Street and Plum Street are using transit, walking or biking. At this intersection, transit passengers, pedestrians and bicyclists experience a lot of delay, while vehicle drivers and passengers do not experience a lot of delay.



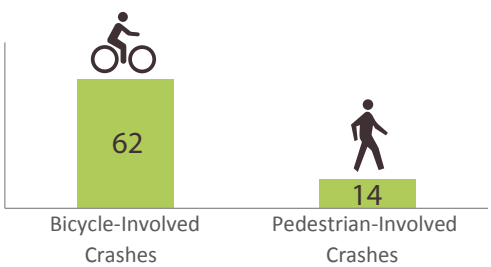


WEST ELIZABETH CORRIDOR
EXISTING CONDITIONS HIGHLIGHTS

SAFETY
CRASHES ON WEST ELIZABETH STREET BETWEEN
2010 & 2014



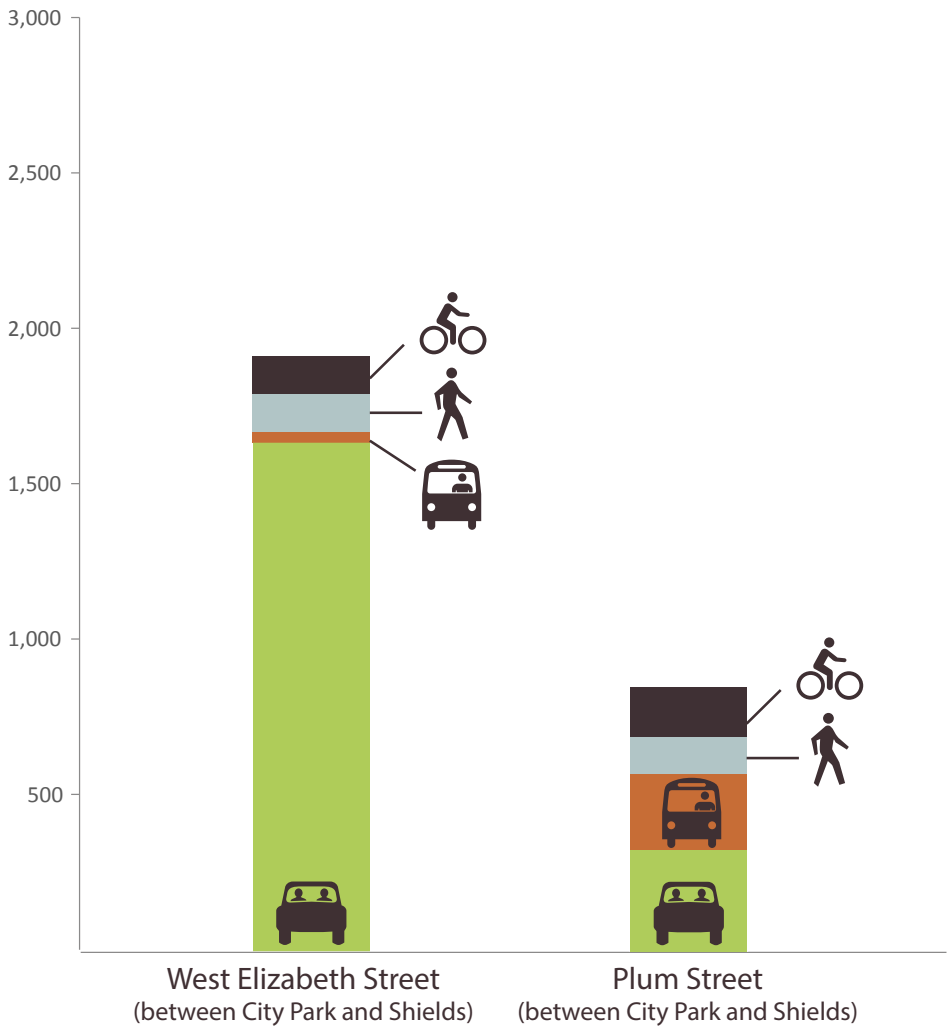
Average of 1 crash every 4 days.



Indicates more crashes than expected compared to similar **intersections** within the city

Indicates more crashes than expected compared to similar **segments** within the city

NUMBER OF PEOPLE BY MODE
PM PEAK HOUR
WEST ELIZABETH STREET & PLUM STREET



WEST ELIZABETH CORRIDOR
EXISTING CONDITIONS HIGHLIGHTS

TRANSIT

Almost 5,000 riders a day within the study area (9 routes):
Highest ridership in the city

Over 3,700 passengers left behind on Route 31 from January to April 2015. That's equivalent to over 37 MAX buses or 75 standard Transfort buses.

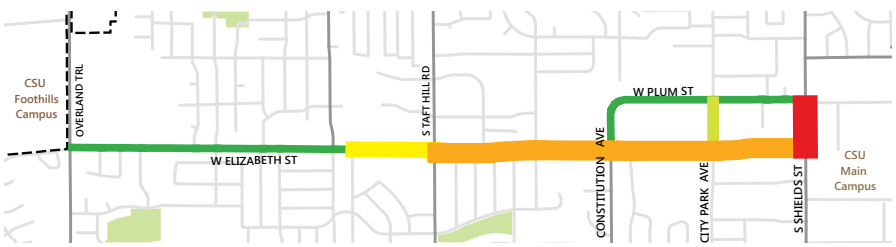
TRANSIT BOARDINGS

Transit boardings from January - April 2015 APC Data

● < 100 ● 100 - 200 ● > 200

DRIVING

AVERAGE DAILY TRAFFIC



Average Daily Traffic (ADT)

< 5,000 | 5,001 - 10,000 | 10,001 - 15,000 | 15,001 - 20,000 | > 20,000

WALKING

36%

of sidewalks in the corridor are non-ADA compliant, of which:

7%

are missing sidewalks.

PEDESTRIAN LEVEL OF COMFORT* CORRIDOR-WIDE

Low Pedestrian Comfort	Medium Pedestrian Comfort	High Pedestrian Comfort
30%	42%	28%

*Pedestrian Level of Comfort is based on a technical analysis of existing data

AVERAGE PM PEAK HOUR PEDESTRIAN DELAY

West Elizabeth Street & City Park Avenue

After 30 seconds, research has indicated that pedestrians partake in more risk-taking behavior.

West Elizabeth Street & Shields Street

BICYCLING

BICYCLIST LEVEL OF COMFORT | CORRIDOR-WIDE

Low Bicyclist Comfort	Medium Bicyclist Comfort	High Bicyclist Comfort
1%	50%	49%

*Bicyclist Level of Comfort is based on a Level of Traffic Stress (LTS) technical analysis of existing data sources

Section 1

INTRODUCTION

THE WEST ELIZABETH ENHANCED TRAVEL CORRIDOR PLAN WILL DEVELOP A LONG-TERM VISION FOR THE WEST ELIZABETH CORRIDOR BASED ON AN UNDERSTANDING OF THE TRANSPORTATION, LAND USE, ENVIRONMENTAL, ECONOMIC, AND SOCIAL NEEDS OF THE AREA. ENHANCED TRAVEL CORRIDORS (ETCS) ARE DEFINED BY THE CITY'S TRANSPORTATION MASTER PLAN (TMP) AND EMPHASIZE HIGH-FREQUENCY TRANSIT, BICYCLING AND WALKING.

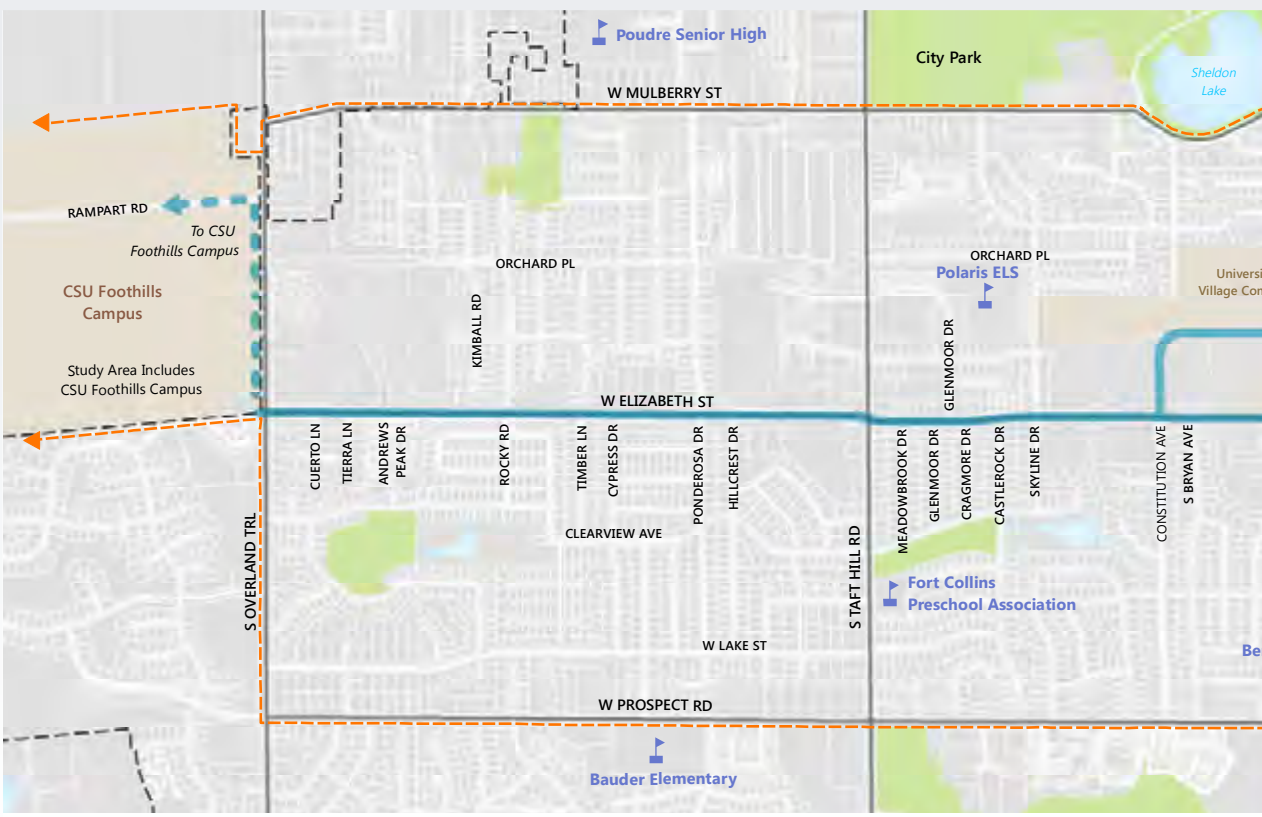
THIS CORRIDOR UNDERSTANDING REPORT documents the West Elizabeth Corridor's history and context, previous planning that has influenced the corridor, and existing conditions of the corridor's infrastructure and performance for different modes of transportation. Future steps of the West Elizabeth Enhanced Travel Corridor Plan development process will build upon the Corridor Understanding Report: developing a purpose and need statement and corridor vision, developing alternative improvement scenarios, analyzing alternative improvement scenarios, and selecting and developing a preferred alternative.

INTRODUCTION

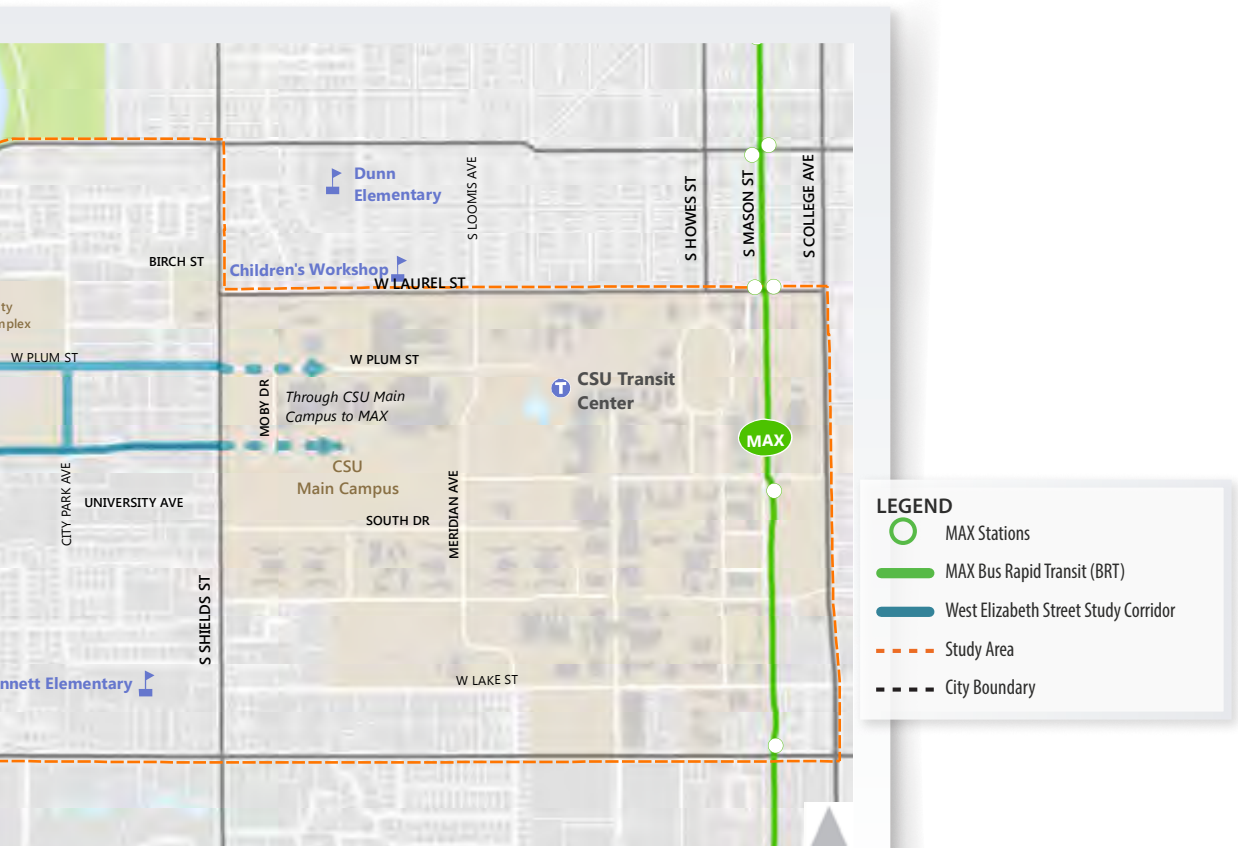
STUDY AREA

As one of six Enhanced Travel Corridors in the City of Fort Collins, West Elizabeth Street has been identified by the City for multimodal improvements. This Corridor Understanding Report is a part of the larger master plan for the corridor, the West Elizabeth Enhanced Travel Corridor Plan. This report documents the existing conditions and context for the West Elizabeth Street Corridor from Shields Street to Overland Trail. The plan also focuses on

FIGURE 1: West Elizabeth Study Area



Plum Street between Shields Street and Constitution Avenue, Constitution Avenue and City Park Avenue between Plum Street and Elizabeth Street and north to Mulberry Street and south to Prospect Road. In addition, the study will consider connections on the Foothills and Main CSU campuses. The broader study area is shown in **Figure 1.**



Elizabeth Street is likely named after Mrs. Elizabeth "Aunty" Stone, who built the first permanent dwelling in Fort Collins with her husband. She also helped operate the City's first hotel, mill and mess hall, built by her husband.[1]

[1] *http://history.poudrelibraries.org/archive/newsflashback/street.php*

HISTORY OF THE WEST ELIZABETH CORRIDOR

Parcels adjoining West Elizabeth Street were annexed into the City during the years between 1950 and 1980. Between Taft Hill Road and Shields Street adjoining parcels were annexed in the 1950s and 1960s while adjoining parcels west of Taft Hill Road were annexed in the 1960s and 1970s. Much of CSU's campus growth west of Meridian Avenue also occurred during this period, including the student housing complexes off of Plum Street, South Drive and Pitkin Street as well as the Indoor Practice Facility at the southeast corner of Plum Street and Meridian Avenue.

West Elizabeth Street has been the location of multi-family housing and retail for a number of decades; much of the multi-family housing was constructed before 2000. However, land uses along the West Elizabeth Corridor have been slowly increasing in density in recent years. In the past few years, higher-density student housing has been infilled along Plum Street. West of Taft Hill Road, the corridor has transformed from a rural agricultural road to one that serves both single-family homes and multi-family housing.

Due to the land uses and proximity to CSU, this corridor has moved a significant amount of vehicular, transit, pedestrian and bicycle traffic for decades. As land use density increases, these volumes are continuing to increase. This increase in travel by all modes and key connections provided by the corridor prompted the designation of the West Elizabeth Corridor as one of six Enhanced Travel Corridors in the 2011 Transportation Master Plan. This designation entails an emphasis on improvements that support transit, biking and walking along and across the corridor.

focus on improving transit, biking and walking in the corridor




REGIONAL AND LOCAL CONTEXT

West Elizabeth Street provides a key east-west connection across the west central part of Fort Collins, including the Campus West area. The West Elizabeth Enhanced Travel Corridor is located between South Shields Street and Overland Trail, acting as a connection from CSU's Main Campus to Foothills Campus for adjacent neighborhoods to the north and south of the corridor. The study of this corridor also considers access to and across CSU's Main Campus. The corridor is situated in one of Fort Collins' most dense areas, which includes a large quantity of rental properties primarily occupied by students.

Regionally, the corridor creates an east-west connection to the MAX Bus Rapid Transit (BRT) line via various Transfort transit routes. Currently, the transition from lines on West Elizabeth to MAX requires a transfer or a half-mile walk from the CSU Transit Station. The corridor also links two major commercial centers located at the West Elizabeth Street/Shields Street intersection and the West Elizabeth Street/Taft Hill Road intersection to the CSU campuses and adjacent neighborhoods. The closest east-west through streets are Mulberry Street a half-mile to the north and Prospect Road a half-mile to the south. **Figure 2** shows a contextual map of how this study correlates to other major destinations in the area.

West Elizabeth Street provides a key east-west connection across the west central part of Fort Collins, including the Campus West area.

Between the CSU Main Campus and CSU Foothills Campus, this corridor provides access to a mix of commercial, mixed use, and residential land uses. There are also a number of CSU-owned multi-family residential properties that are accessed along West Elizabeth Street and Plum Street. The majority of the dense commercial land uses are on the east side of the corridor. There are also commercial shopping centers on the northwest and southwest corners of the West Elizabeth Street/Taft Hill Road intersection.

This corridor was identified as an Enhanced Travel Corridor (ETC) in the 2011 Transportation Master Plan (TMP). This distinction recognized Elizabeth as a high priority corridor with a significant amount of transit, bicycle and pedestrian activity in addition to vehicular use. Another goal of the ETCs is to accomplish the triple bottom line of economic, human and environmental sustainability.

See **Figure 3** for a map of all of the designated Enhanced Travel Corridors. The concept of Enhanced Travel Corridors (ETC) was introduced in the 2004 Transportation Master Plan (TMP) to "promote safe, convenient, and direct travel, with an emphasis on high frequency transit service and bicycle and pedestrian facilities."

West Elizabeth is the third ETC to begin the corridor planning process (after Harmony Road and College Avenue/Mason Corridor) See the description of the Transportation Master Plan in Section 3 (Existing Plans) for more details.

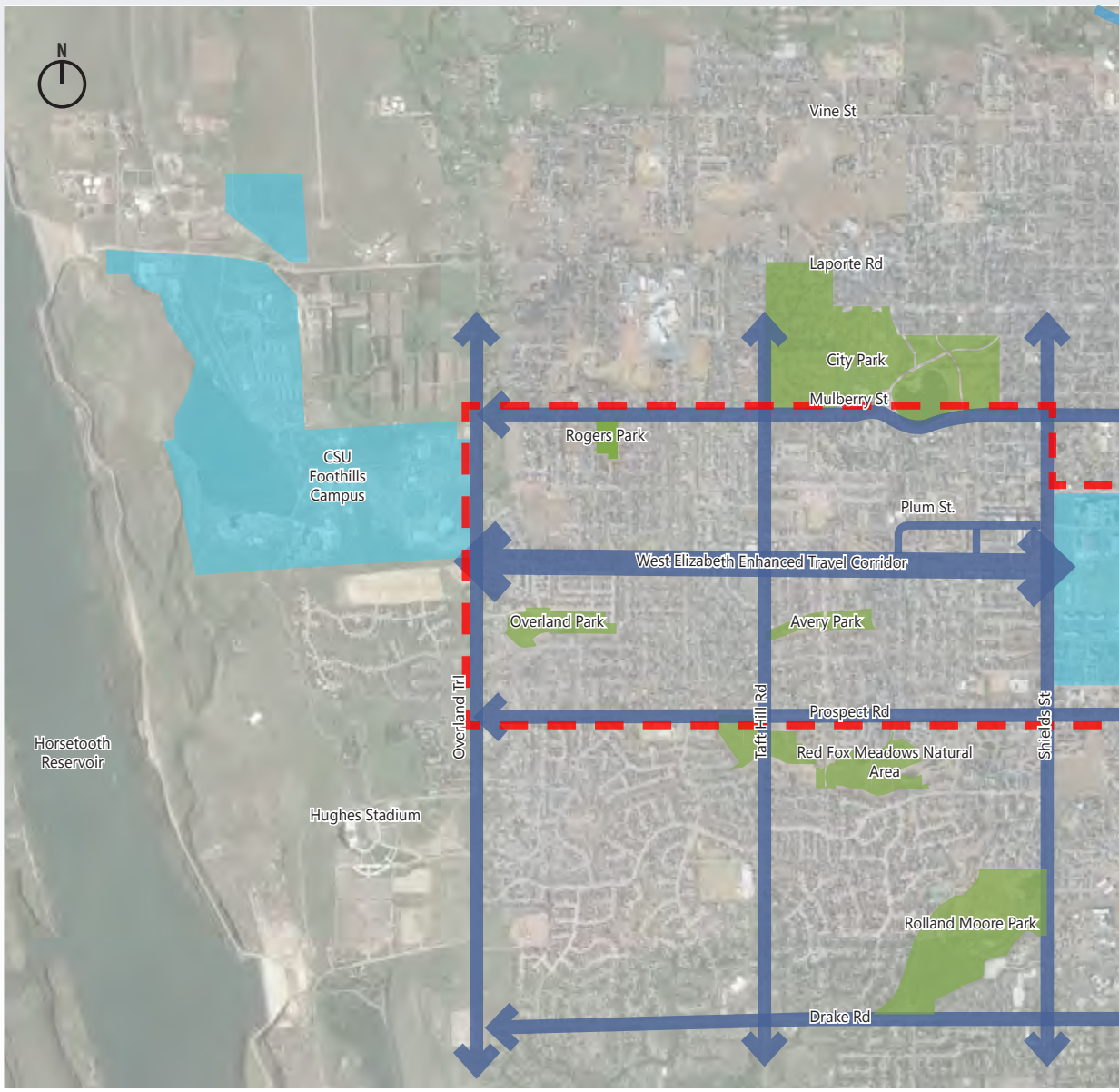
The 2004 Transportation Master Plan (TMP) identified the following four Enhanced Travel Corridors:

- Harmony Road
- College Avenue/Mason Corridor
- Mountain Vista/North College
- Timberline Road/Power Trail

The 2011 TMP added two new Enhanced Travel Corridors:

- Prospect Road
- West Elizabeth Street

FIGURE 2: **Regional Context Map**



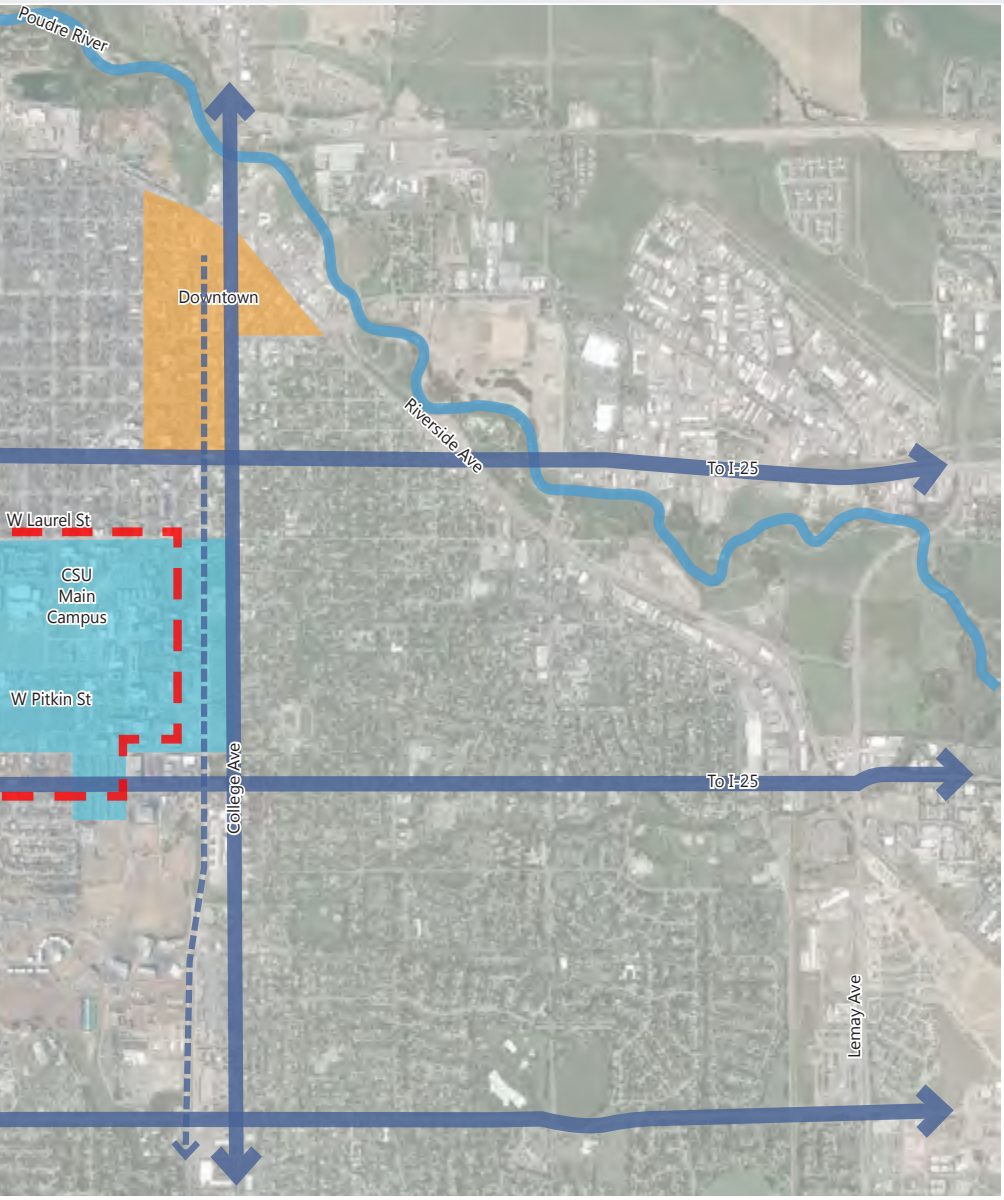
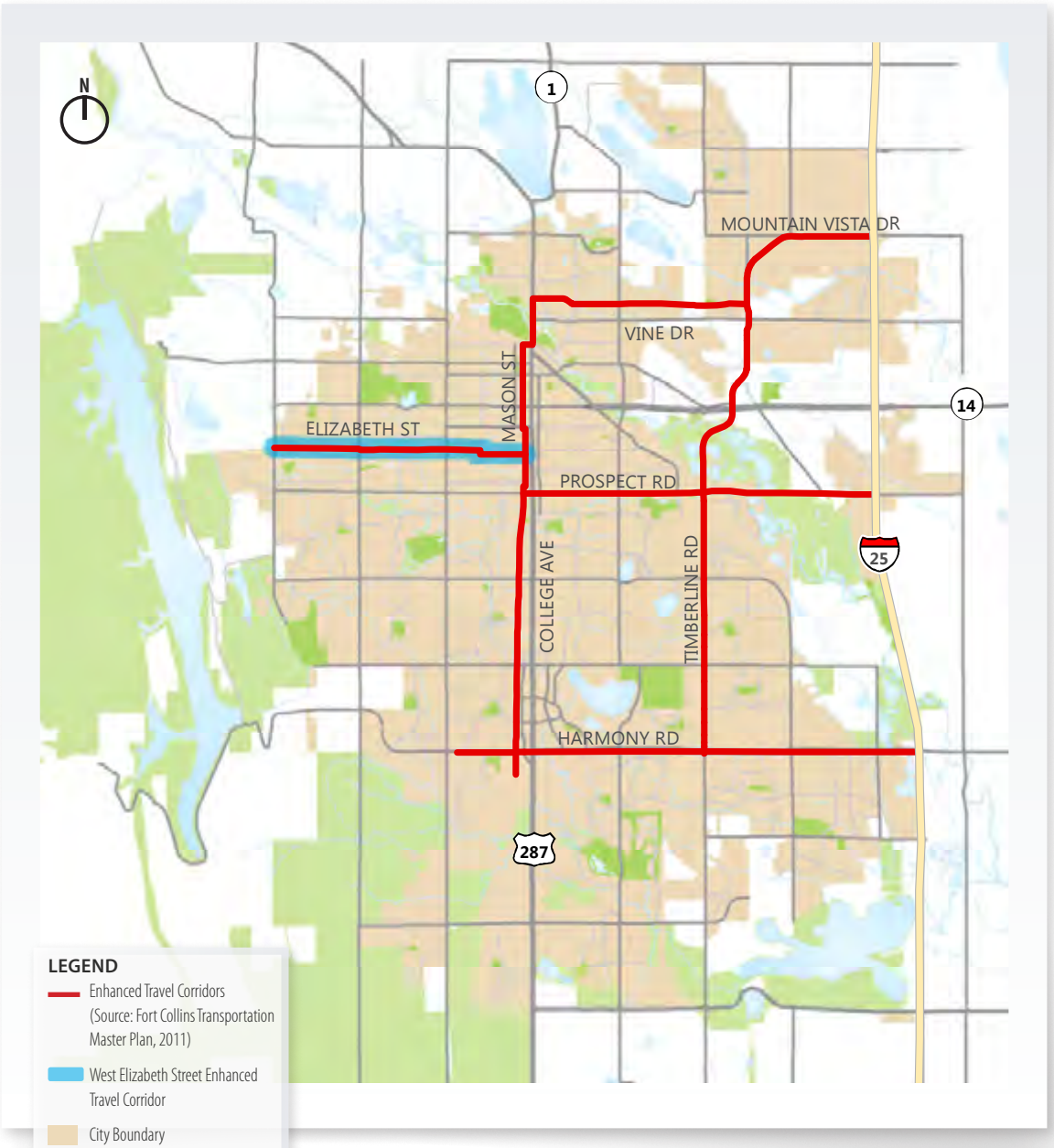

Poudre River
Downtown
Riverside Ave
To I-25
W Laurel St
CSU
Main
Campus
W Pitkin St
College Ave
To I-25
Lemay Ave
LEGEND
Study Area
West Elizabeth Enhanced Travel Corridor
Key Arterial
Corridor Study Segments: Plum St., Constitution Ave., City Park Ave.
MAX
Parks and Natural Areas
CSU

FIGURE 3: Enhanced Travel Corridors



EXISTING LAND USE

Land use in the western section of West Elizabeth and the remainder of the study area is largely single-family residential properties. Land use along Plum Street and the eastern section of West Elizabeth Street is largely multi-family and commercial. Multi-family developments exist near commercial centers at the West Elizabeth Street/Shields Street intersection, West Elizabeth Street/Taft Hill Road intersection, and the West Elizabeth Street/ Overland Trail intersection. A number of religious institutions exist within the study area as well, primarily in the area from Shields Street to Taft Hill Road between Mulberry Street and Prospect Road. Neighborhood parks and small open spaces are found throughout the study area; however, no major open spaces exist here, aside from City Park, located north of Mulberry Street. The land use mix along the corridor is shown in **Figure 4.** CSU, which has 27,086 students and 7,000 employees, heavily influences transportation demand on the corridor.[2]

Zoning

A large portion of the study area is zoned RL – Low Density Residential, as shown in **Figure 5.** West Elizabeth Street and Plum Street consists primarily of zone districts of medium density mixed-use neighborhood in the eastern portion of the corridor. There is also a district of neighborhood commercial at West Elizabeth Street and Taft Hill Road as well as a large area zoned CC – Community Commercial, near the West Elizabeth Street/ Shields Street intersection. Within this zone, a range of land uses are permitted, such as religious institutions, multi-family residential or commercial.

Services and Destinations

Services and destinations along the corridor primarily exist within commercial centers near the West Elizabeth Street/Shields Street intersection and the West Elizabeth Street/Taft Hill Road intersection. Destinations here include restaurants, retail and shopping centers/markets. Two elementary schools and one combined middle/high school exist within the study area Polaris ELS is K-12 (combined Elem/MS/ HS) as well as a few immediately outside of the area. CSU's two campuses, Main Campus and Foothills Campus, are also key destinations. **Figure 6** shows services and destinations in the study area.

Demographics

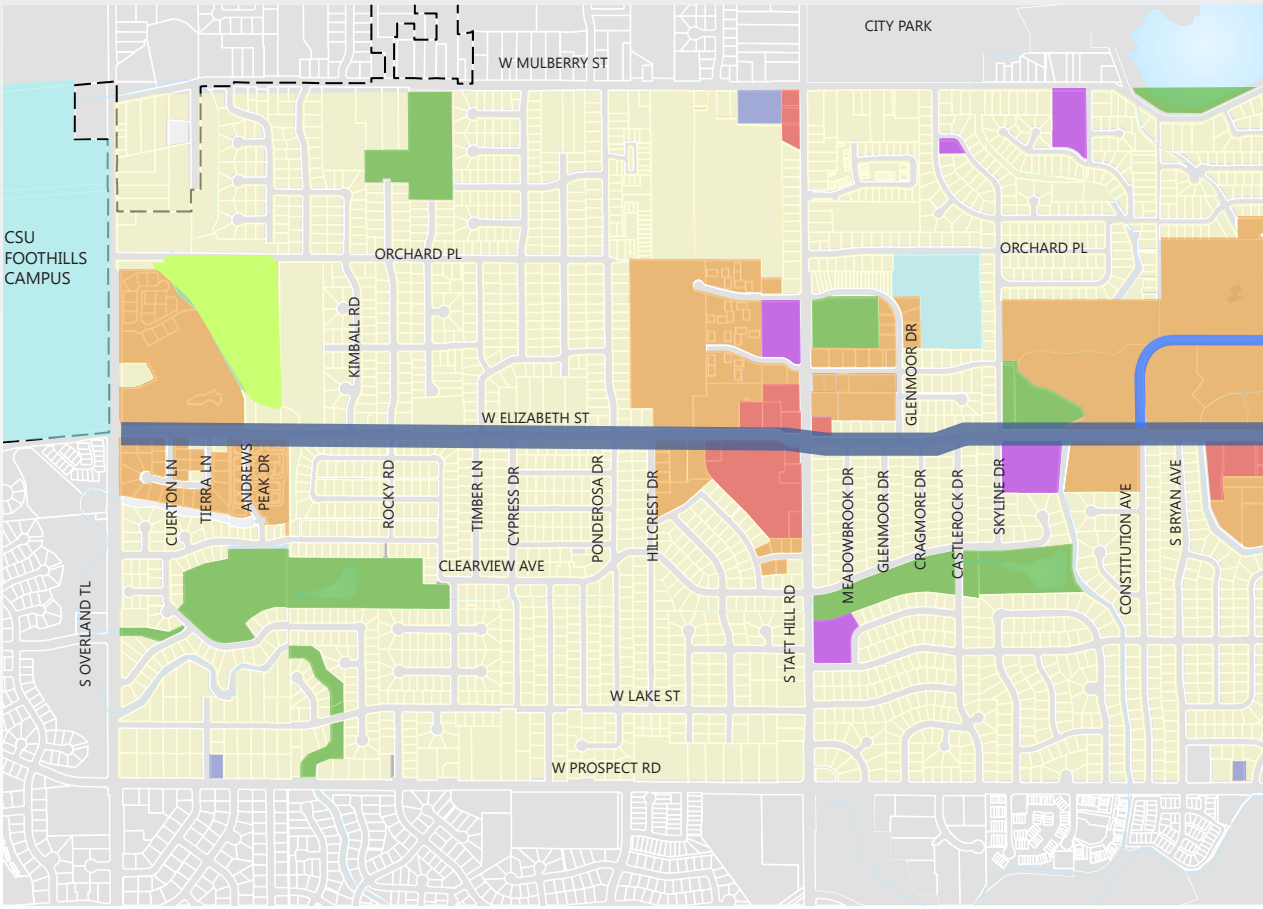
The study area is one of the most densely populated areas in the City of Fort Collins, due to the high number of multi-family and/or student-oriented facilities. Within the area, there are between 16,500 and 24,000 residents based on US Census data. This is approximately 10 percent of the total population of the City of Fort Collins within four percent of the land area in City Limits. The total population by census tract is shown in **Figure 7. Appendix A** shows the distribution of employees and students within the study area. The West Elizabeth study area houses over 5,000 CSU students and 835 CSU employees. It is important to note that the number of students in the corridor is likely underrepresented as the data is based on students voluntarily providing local addresses (which approximately 50% have done).

[2] *http://www.ir.colostate.edu/pdf/fbk/1415/Students/index.htm*

The North Front Range Regional Travel Model (NFR Model) shows approximately 20,000 employees within the study area in 2012. Out of these employees, about 80 percent work in services (including CSU), 14 percent work in retail, 4 percent in medical and the remaining 2 percent are categorized by the model as "basic" employees.

The study area has a significant proportion of rental properties. Between 52 percent and 87 percent of the population within the study area are renters, of whom most are CSU students.

FIGURE 4: Existing Land Use



This is higher than other areas nearby, where between 42 percent and 52 percent of the population are renters rather than owners. **Figure 8** shows the percent of renters in various segments of the study area.

Demographic data is from the US Census Bureau.

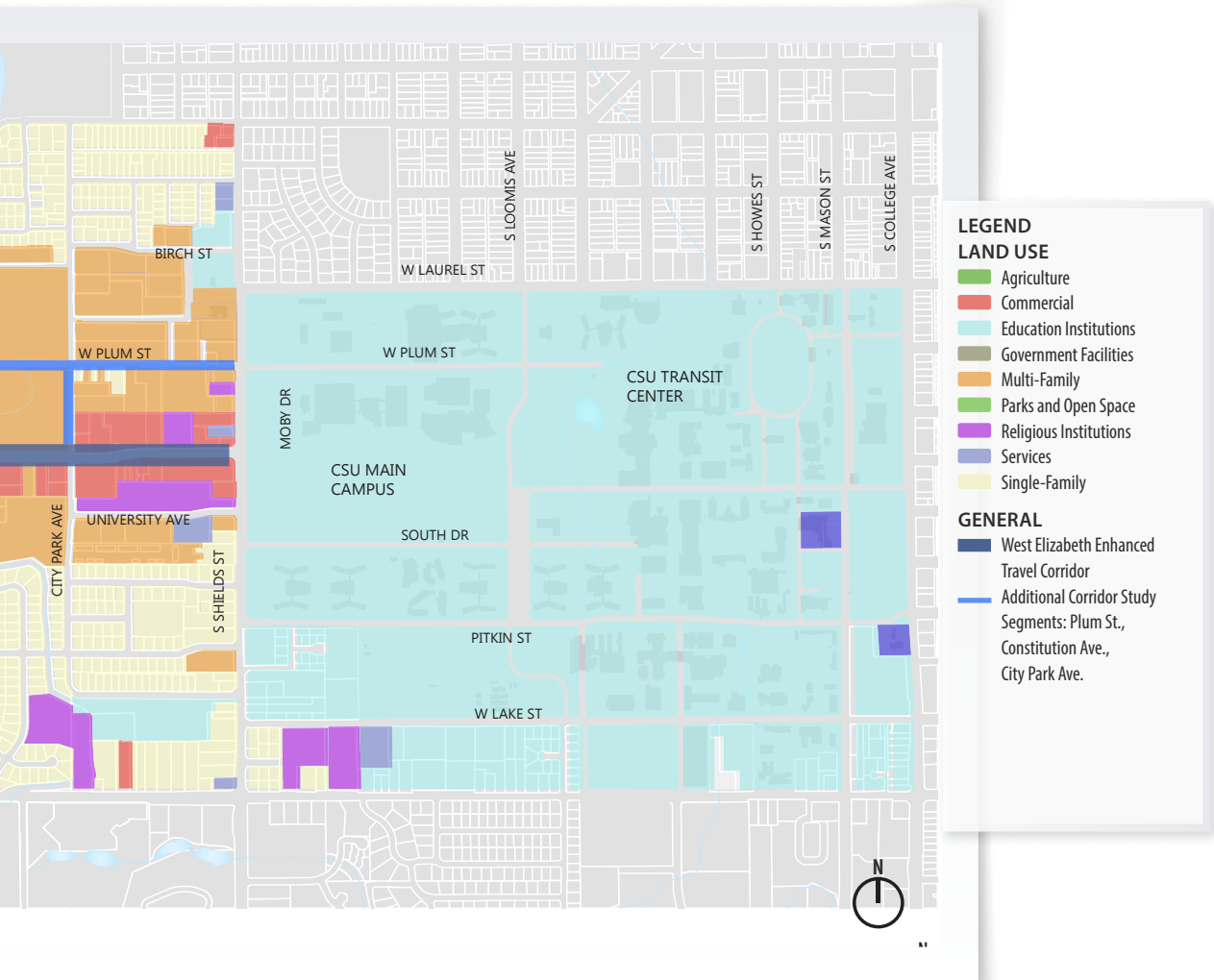
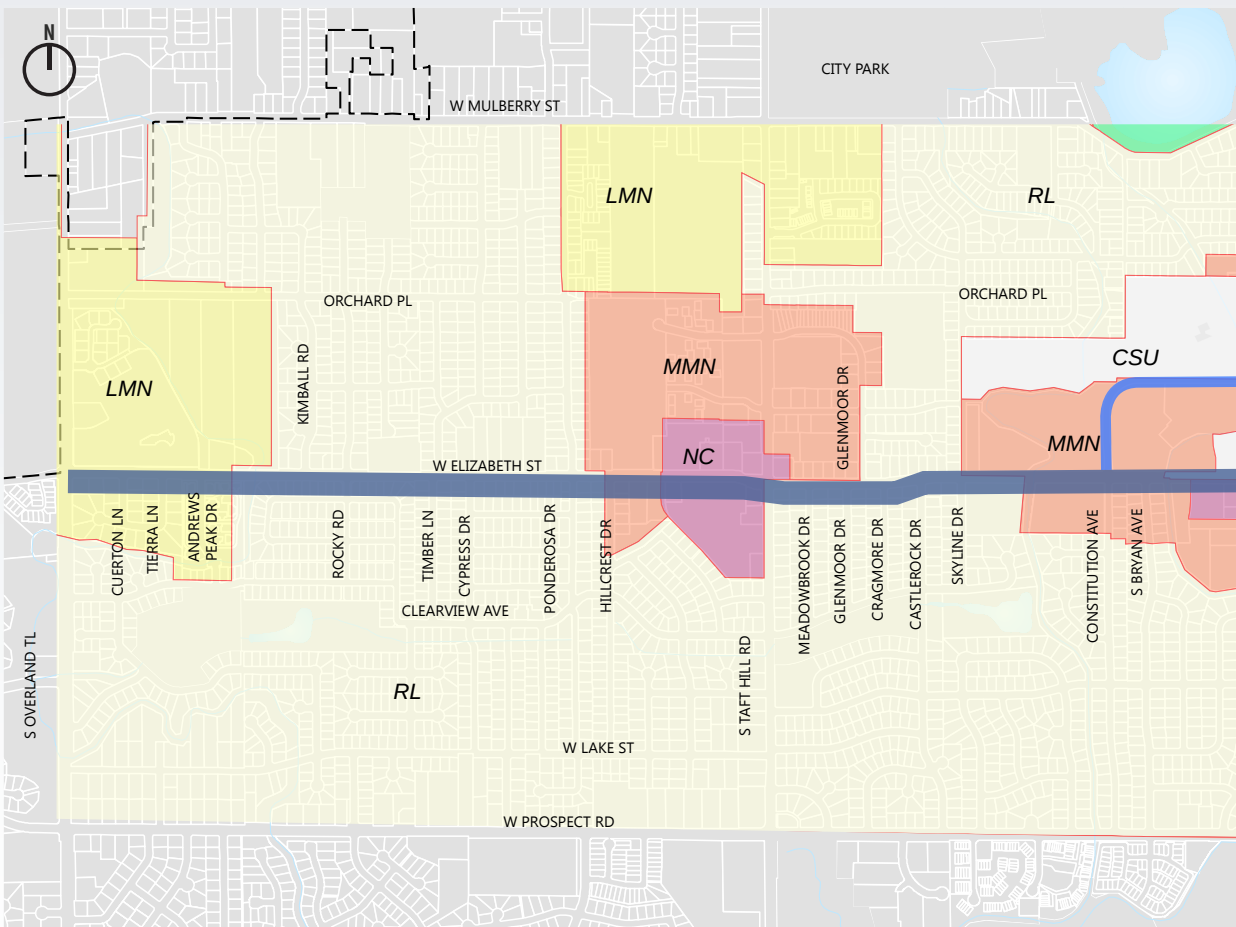
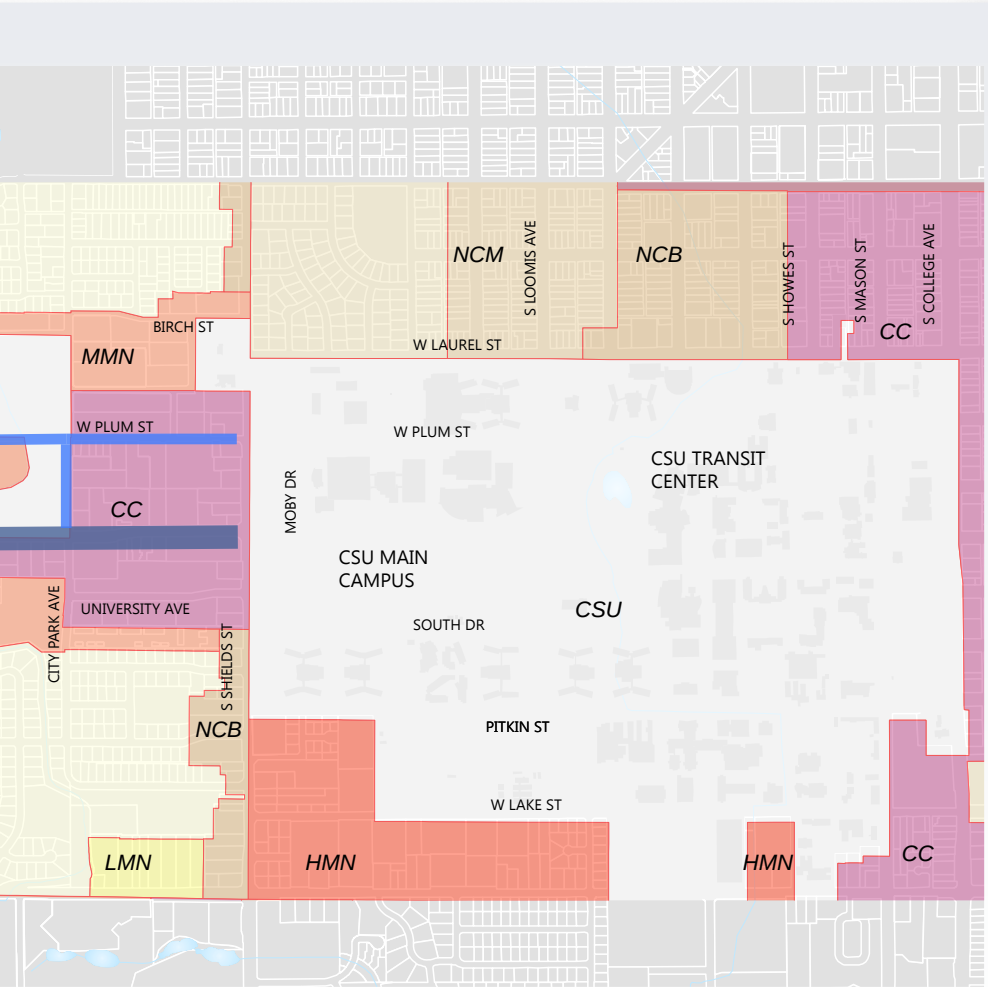


FIGURE 5: Existing Zoning





LEGEND

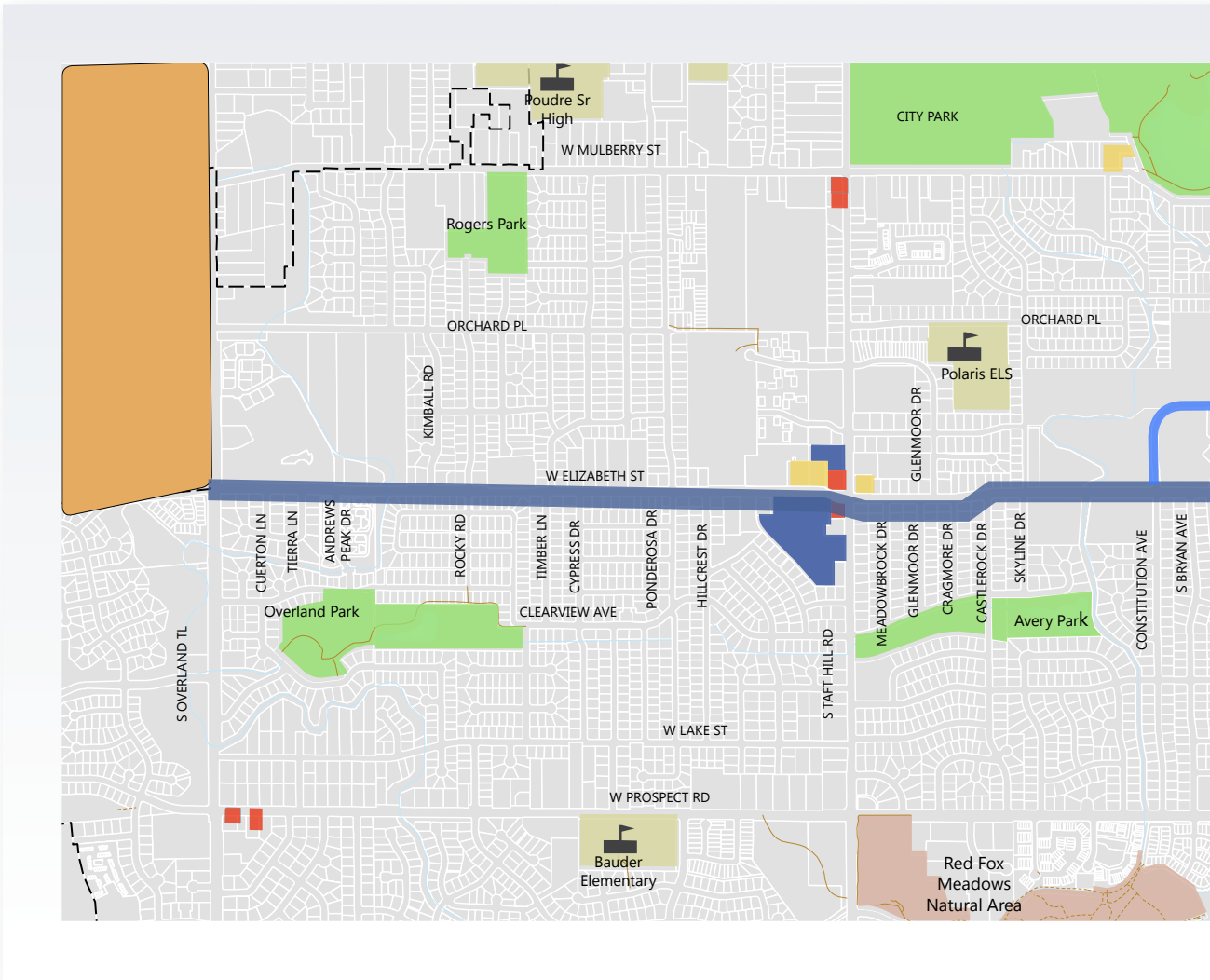
ZONE

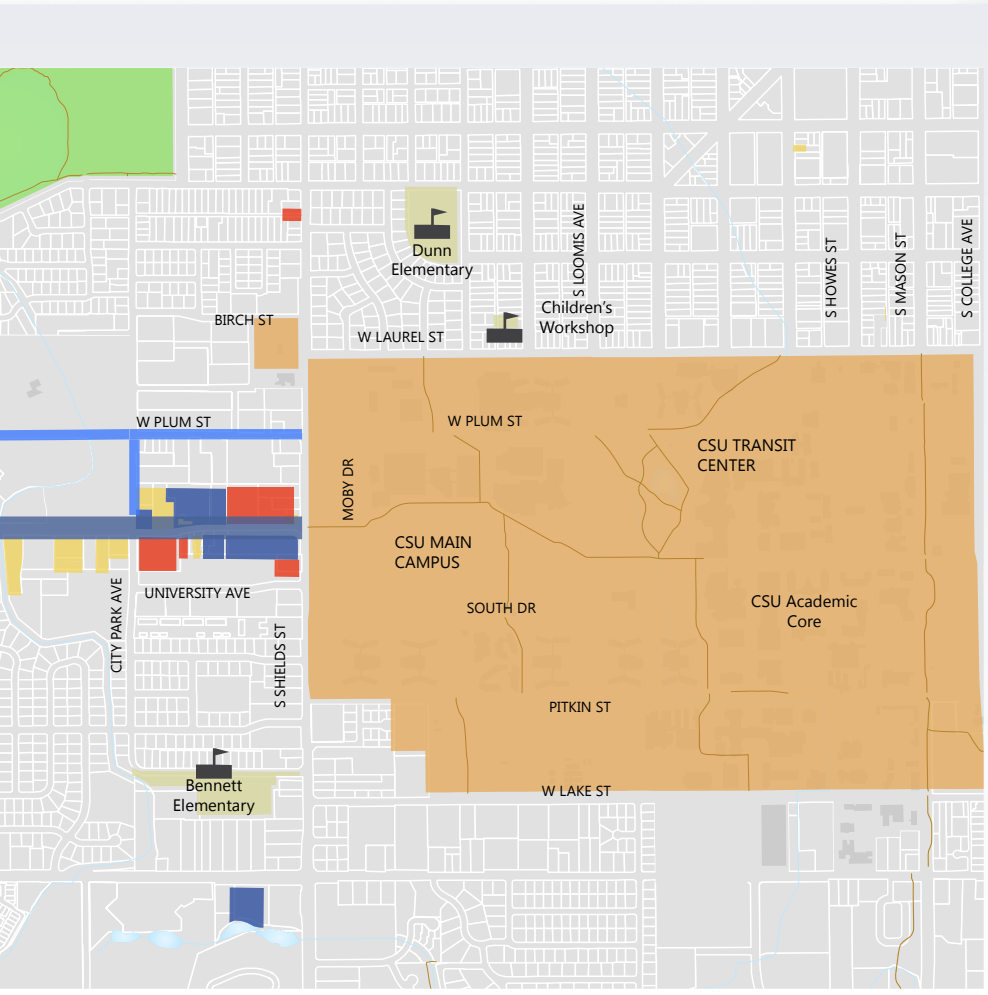
- Community Commercial (CC)
- CSU
- Downtown (D)
- Employment (E)
- High Density Mixed-Use Neighborhood (HMN)
- Low Density Mixed-Use Neighborhood (LMN)
- Medium Density Mixed-Use Neighborhood (MMN)
- Neighborhood Commercial (NC)
- Neighborhood Conservation Buffer (NCB)
- Neighborhood Conservation Low Density (NCL)
- Neighborhood Conservation Medium Density (NCM)
- Public Open Lands (POL)
- Low Density Residential (RL)
- Urban Estate (UE)

GENERAL

- West Elizabeth Enhanced Travel Corridor
- Additional Corridor Study Segments: Plum St., Constitution Ave., City Park Ave.

FIGURE 6: **Existing Services and Destinations**





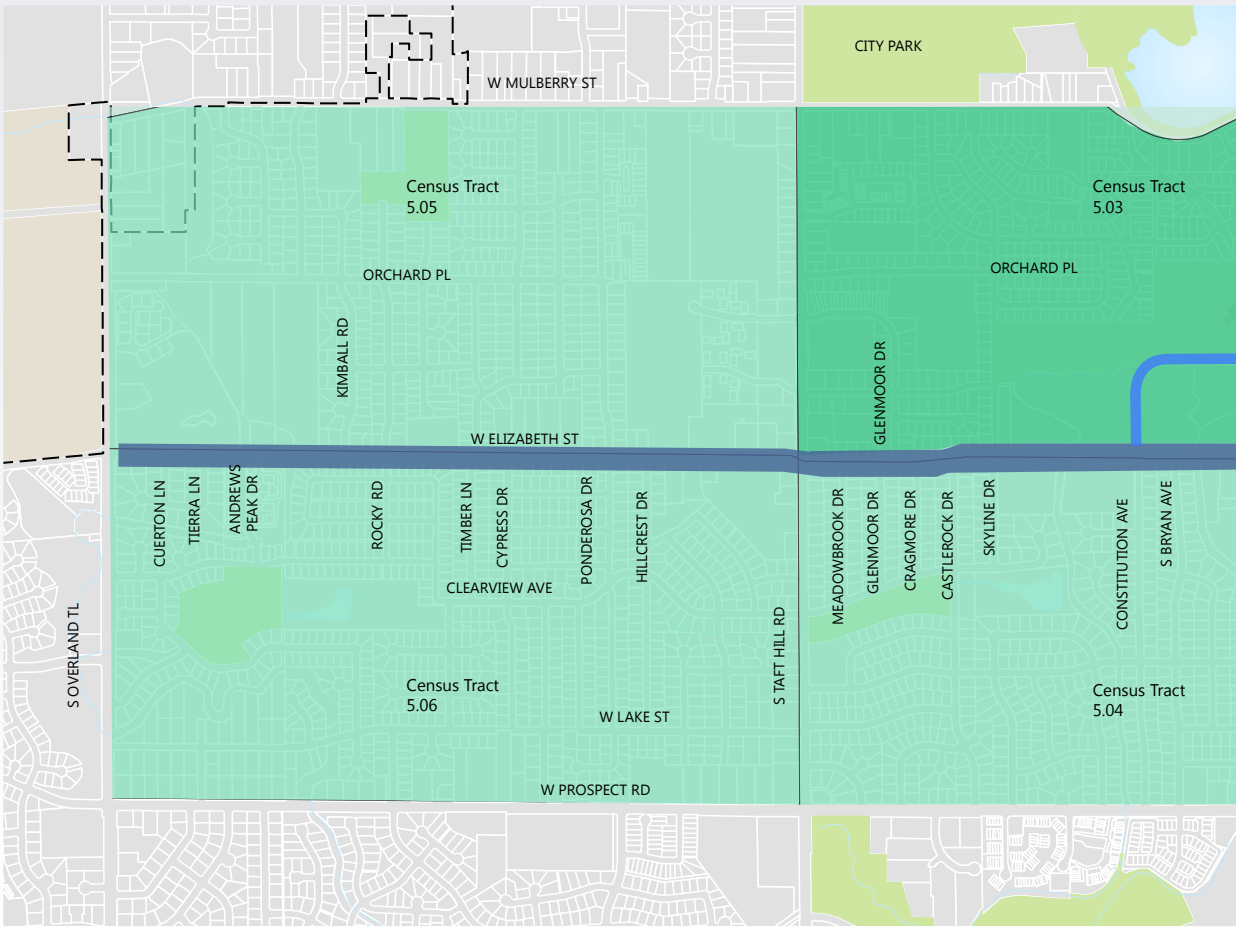
LEGEND

SERVICE TYPE
- Restaurant/Bar
- Misc. Retail/Commercial
- Neighborhood Shopping Center

SCHOOLS, PARKS, NATURAL AREAS
- City of Fort Collins Natural Area
- Parks
- Schools
- Schools
- Colorado State University
- Paved Major Trail
- Natural Surface Major Trail
- Paved Minor Trail
- Natural Surface Minor Trail

GENERAL
- West Elizabeth Enhanced Travel Corridor
- Additional Corridor Study Segments: Plum St., Constitution Ave., City Park Ave.

FIGURE 7: **Existing Population**



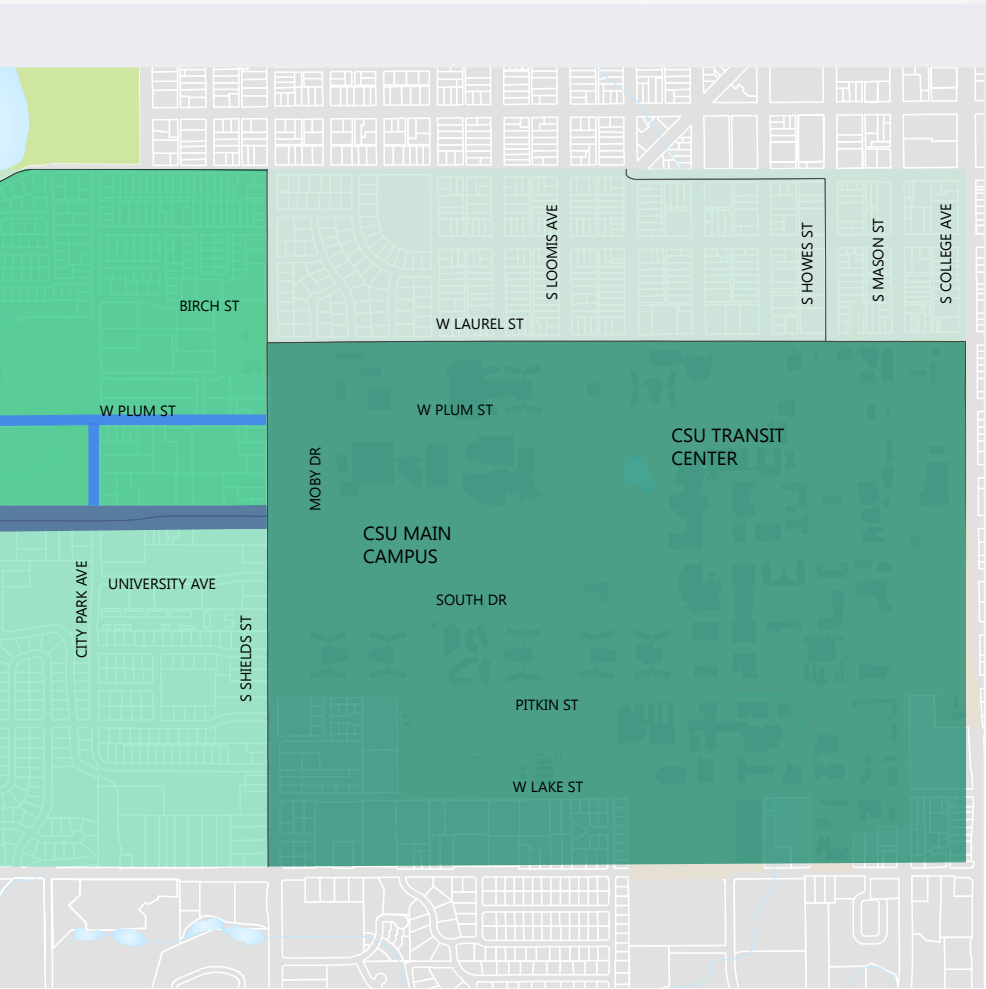
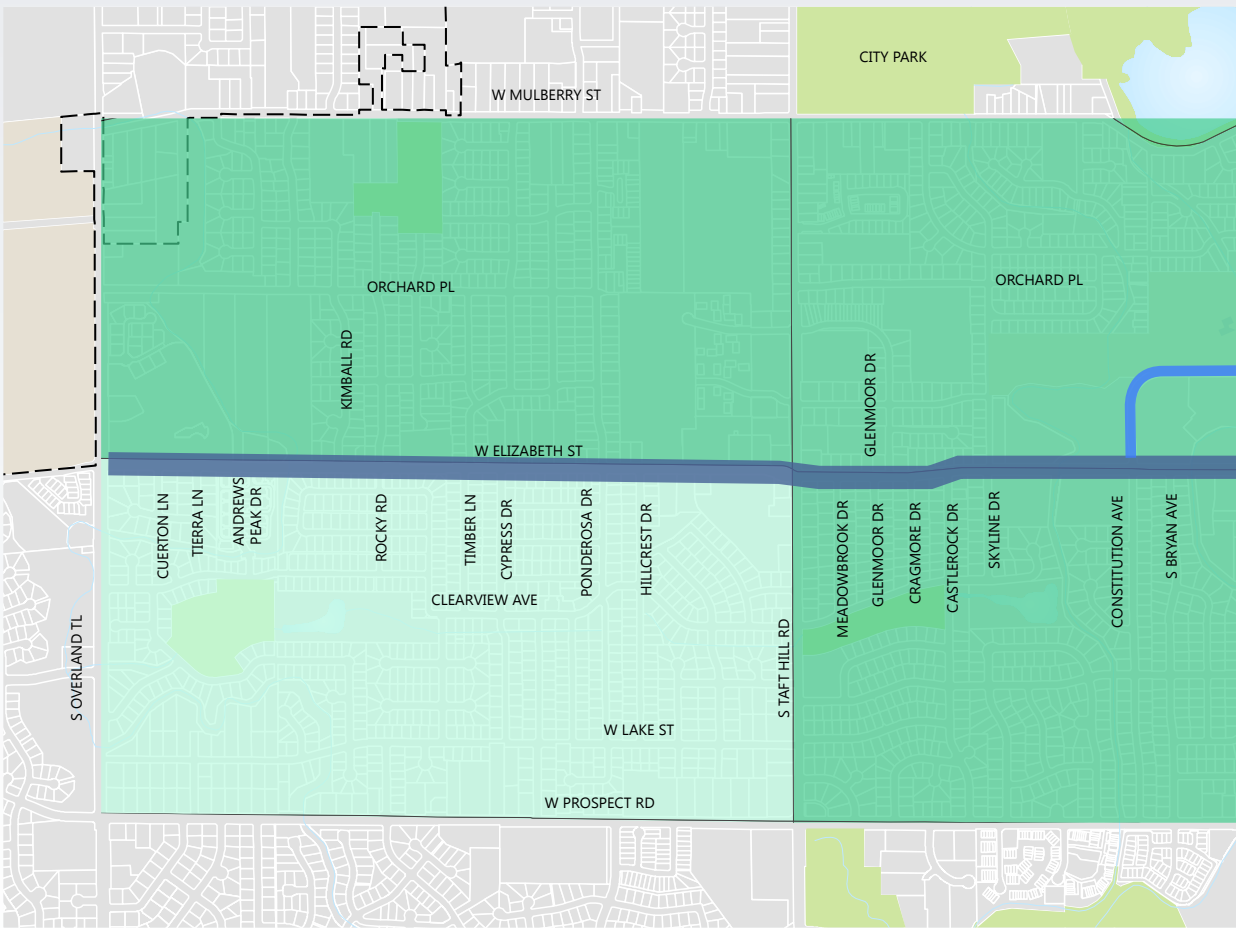
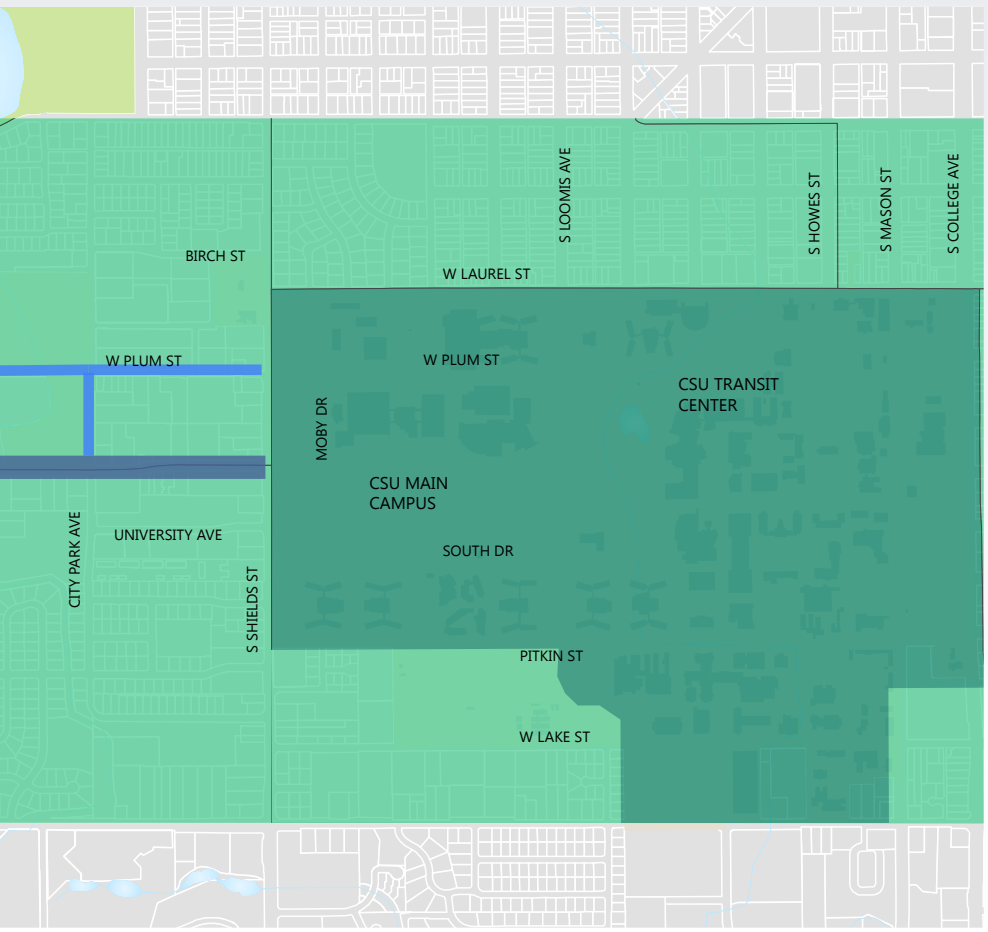

BIRCH ST
W LAUREL ST
S LOOMIS AVE
S HOWES ST
S MASON ST
S COLLEGE AVE
W PLUM ST
W PLUM ST
MOBY DR
CSU TRANSIT CENTER
CSU MAIN CAMPUS
SOUTH DR
CITY PARK AVE
UNIVERSITY AVE
S SHIELDS ST
PITKIN ST
W LAKE ST
LEGEND
TOTAL POPULATION
0 - 2,500
3,201 - 5,000
2,501 - 3,200
5,001 - 6,500
GENERAL
West Elizabeth Enhanced Travel Corridor
Additional Corridor Study Segments: Plum St., Constitution Ave., City Park Ave.

FIGURE 8: **Existing Percent Renters**




BIRCH ST
W LAUREL ST
S LOOMIS AVE
S HOWES ST
S MASON ST
S COLLEGE AVE
W PLUM ST
W PLUM ST
MOBY DR
CSU TRANSIT CENTER
CSU MAIN CAMPUS
UNIVERSITY AVE
CITY PARK AVE
S SHIELDS ST
SOUTH DR
PITKIN ST
W LAKE ST
LEGEND
PERCENT RENTERS
42%-52%
53%-87%
88%-100%
GENERAL
West Elizabeth Enhanced Travel Corridor
Additional Corridor Study Segments: Plum St., Constitution Ave., City Park Ave.
Between 52 percent and 87 percent of the population within the study area are renters, of whom most are CSU students

Section 2

EXISTING PLANS

Fort Collins values its transportation network and understands the need for accessibility, mobility, and capacity associated with all modes: vehicles, transit, pedestrians and bicyclists. Recently the City has worked with consultant teams and citizens to evaluate each transportation element and to develop the Transportation Master Plan *(TMP) (February 2011)* and City Plan *(February 2011)*. These plans, as well as other related studies and plans, were reviewed and are summarized on the following pages.

EXISTING PLANS

TRANSFORT STRATEGIC OPERATING PLAN FINAL REPORT *(August 2009)*

The Transit Strategic Plan (TSP) was a collaborative effort between the City of Fort Collins-Transfort, the City of Loveland-COLT, and the Poudre School District (PSD). It updated the 2002 Transfort Strategic Operating Plan (TSOP), the 2004 COLT Transit Plan, and included an analysis of the opportunities public transportation offers PSD high schools. The plan also addressed the Mason Corridor MAX project and its impact on other transit services within the City; identified funding mechanisms and practical phasing options; and developed financial solutions required to create and sustain a high-performing transit system. Six primary goals were developed to guide the development of this plan: (1) meet the Transportation Master Plan and City plan policies; (2) exceed the 2008 Climate Action Plan goal; (3) provide enhanced mobility for transit-dependent populations; (4) develop a transit system that reduced roadway-related costs; (5) provide funding recommendation for implementation and (6) stimulate the local economy. The plan outlined three phases of proposed service concepts:

Phase 1 – Planned near-term (3-year horizon) transit service improvements that were recommended to enhance efficiency. These improvements included changes in the schedules of seven routes, the elimination of one route, the addition of one route, and the implementation of MAX and coordination of other routes. Partial implementation of Phase 1 occurred in May 2014 with the implementation of MAX BRT service; full Phase 1 improvements are not fully realized.

Phase 2 – Short-term (5-year horizon) solutions to provide better connectivity and accessibility locally and regionally. This phase recommended significant expansion of the current transit service in Fort Collins, additional regional connections to Denver, and continued refinement of local routes to coordinate with MAX. Phase 2 introduced a transition to a grid network in Fort Collins and provided greater route coverage, higher service frequencies, and longer span of service. A portion of the Phase 2 recommendations have been implemented.

Phase 3 – Long-term (7-year horizon) plan for additional transit growth in Fort Collins. This phase included longer service hours and limited Sunday transit service, as well as expansion of regional service to Denver, Boulder, Berthoud, and Longmont. This phase also completed the transition to a full grid network in Fort Collins.

In May 2014, the MAX had its grand opening to showcase the newest transit route in Fort Collins. This Bus Rapid Transit (BRT) system runs along the Mason Corridor from the South Transit Center (south of Harmony Road) to Downtown. It serves the major activity and employment centers of Fort Collins and links transit routes, park-n-rides, and trails, while minimizing delays as compared to those experienced on parallel corridors.

West Elizabeth Corridor: West Elizabeth Street is identified in each of the 3 phases of service concepts. Phase 1 recommends West Elizabeth Street alignment changes to Route 2 and the elimination of its reverse loop route (current Route 32). Phase 2 recommends extending evening service hours until midnight. Phase 3 assumes the implementation of two new east/west MAX routes from Overland Trail through campus that interline onto the MAX guideway, one connecting to the Downtown Transit Center and the other continuing south to the South Transit Center.

TRANSPORTATION MASTER PLAN/MASTER STREET PLAN *(2011)*

The Transportation Master Plan (TMP), along with City Plan, comprises Plan Fort Collins. The TMP describes the long-term (2035) multimodal vision for Fort Collins and the steps necessary for implementation in order to achieve the City's vision, including policy guidance. It provides actions and strategies for implementing projects to meet short-term needs while also working towards long-term goals. This document is a dynamic guide for city council, City staff, boards, commissioners and the community.

Fort Collins understands the need for accessibility, mobility, and capacity associated with all modes: vehicles, transit, pedestrians and bicyclists.

The Master Street Plan (MSP), an appendix to the Transportation Master Plan, is a map of the City's long-range vision for its major street network. This includes

existing and future vehicle connections throughout the City and its growth management area. The MSP also reflects the classification of roadways (collector, arterial, etc.) and the general location for planned transportation connections. Final street alignments are determined and designed at the time of development.

During the 2010-2011 update, 14 locations were evaluated to determine the implications of changing their classification. One of the major outcomes was that no streets were identified to expand their current street classification through the 2035 horizon year. This indicates that the current roadway classification is adequate. In some cases, the updated plan proposed to reduce the classification for specific street segments to redefine the purpose and mode hierarchy. The MSP also includes an overlap map to identify roadways that should be redesigned as Enhanced Travel Corridors (ETCs).

ETCs provide direct and accessible connections between major activity centers like Downtown, CSU, Midtown, employment centers, shopping destinations, and neighborhoods. While ETCs have a general purpose to decrease travel times along the corridor, each individual corridor will have a different, unique way to provide the specific needs and connections. The ETCs are defined as special focus areas that emphasize enhanced infill and redevelopment along the corridor, increase overall corridor capacity while better utilizing alternative modes and defining space for each of the travel modes.

West Elizabeth Corridor: The TMP identified West Elizabeth Street from CSU to Overland as one of two new Enhanced Travel Corridors. This corridor is identified due to its strong connections to CSU Foothills, Campus West, and MAX. This project is an opportunity to expand on bicycle, pedestrian and transit improvements to key destinations.

The City's current ETCs include:

College Avenue/Mason Corridor – connecting Downtown to the communities approximately ½ mile south of Harmony Road (the Mason Corridor Environmental Assessment Technical Report was completed in 2008, the MAX BRT Re-evaluation was completed in 2010, and the Midtown in Motion: College Avenue Transportation Study was completed in 2014);

Harmony Road – connecting I-25 to Front Range Community College (FRCC), which will be extended to the Mason Corridor (the Harmony Road ETC Master Plan and Alternatives Analysis was completed in 2013);

Mountain Vista Drive/North College Avenue Corridor – connecting the Downtown Transit Center to Mountain Vista neighborhood;

Prospect Road (from CSU/Mason to I-25);

Timberline Road/Power Trail – connecting Harmony Road to Mountain Vista; and

West Elizabeth Street (from CSU to Overland/CSU Foothills).

CITY PLAN *(February 2011)*

City Plan is the comprehensive plan for Fort Collins. It describes the vision for the city for the next 25 years and beyond, and the steps necessary to reach that ultimate vision. City Plan was updated in 2010 simultaneous with the Transportation Master Plan update in order to increase collaboration and share resources between planning processes. Together, these plans and processes comprise Plan Fort Collins.

West Elizabeth Corridor: City Plan identified the West Elizabeth Street Enhanced Travel Corridor Plan as a longer-term action, marked for 2013 and beyond.

PEDESTRIAN PLAN

(February 2011)

The Pedestrian Plan outlined issues and proposed solutions to problems for pedestrians with the ultimate goal of providing safe, easy, and convenient pedestrian travel for all members of the community. This effort also updated and prioritized the City's list of pedestrian improvement projects and explored potential funding options. The purpose of the Pedestrian Plan was to promote a pedestrian-friendly environment that will encourage the choice to walk for visitors, students, and residents. The plan utilized a new GIS analysis tool that forecasted pedestrian demand using citywide "indices" of walking demand. These forecasts were used to evaluate future pedestrian improvements.

The 2010-11 update includes a pedestrian priority project list. This list combines remaining 2004 Capital Improvement Program (CIP) projects and new projects identified by citizens over the previous year. The plan also includes crossing guidelines such as when and how to mark a crosswalk and treatments to use at uncontrolled intersections.

West Elizabeth Corridor:
The West Elizabeth study area from Shields Street to City Park Avenue is identified as a part of the Downtown/CSU pedestrian district.

COLORADO STATE UNIVERSITY (CSU) MASTER PLAN UPDATE

(Spring 2012)

The CSU Master Plan is the document that maps the physical needs of the University and provides a tool to assess and plan for the future. This document provided University leadership with an outline of current and future program needs and budget requirements to successfully direct and build a legacy for future generations. This plan provided a collection of maps, conceptual designs, and graphical displays that updated the 2004 Campus Master Plan, including a history of the campus master plan, zoning conditions, projects under construction, funded projects, pedestrian and green space, access, transit, and housing redevelopment. The plan separated the campus into three sections—(1) Foothills, (2) Main Campus, and (3) South Campus—to depict current and future conditions and a framework diagram.

West Elizabeth Corridor: The framework diagram that is a part of the master plan shows West Elizabeth Street as a corridor for transit, bikes, and vehicles. Two relevant guiding principles identified as a part of this diagram are to make campus permeable to the community and maximize alternative modes of transportation. Guiding principles identified for the Foothills Campus are to establish bicycle and pedestrian gateways and to establish mass transit.

ARTERIAL INTERSECTION PRIORITIZATION STUDY

(March 2012)

The purpose of the Arterial Intersection Priority Study was to identify intersections that are in need of mobility and safety improvements. The study included an evaluation of traffic volume, intersection accidents, intersection delay, pedestrian and bicycle safety and transit operations. The analysis also relied on input from the community to help clarify local concerns and provide input on arterial intersections throughout the City. The community values developed in Plan Fort Collins were used to evaluate the intersections utilizing a data-driven process. The study applied "a wide breadth of evaluation criteria to ensure that the selected projects addressed specific transportation needs and also aligned with the City's core values." The evaluation process included three main steps:

Level 1 - Initial screening to identify intersections with the greatest safety and operational needs. Based on those results, and input from staff and others stakeholders, various alternatives or improvement options were developed for further consideration and evaluation.

Level 2 - Detailed evaluation of the alternatives. This evaluation was based on community values and designed to test options to find alternatives that meet these values and address the safety and operational issues identified in the initial screening.

Level 3 - Conceptual designs were developed for the final set of intersections.

West Elizabeth Corridor: Thirty-two intersections throughout the City were carried forward from Level 1 to the Level 2 analysis, including one within the West Elizabeth Enhanced Travel Corridor Plan study area: the Elizabeth Street/Shields Street intersection. This intersection was not carried forward for Level 3 analysis.

An update to this study is currently in progress.

CAPITAL IMPROVEMENT PLAN DOCUMENTATION *(December 2012)*

The Transportation Capital Improvement Plan (CIP) is an inventory of all multimodal transportation projects throughout the City and is a part of the Transportation Master Plan (TMP). The CIP was updated using an interdisciplinary team and 'triple bottom line' approach that included environmental, economic, and social factors as project prioritization criteria in conjunction with the traditional transportation criteria. The CIP is a tool that facilitates the allocation of resources based on project- and system-level prioritization reflecting the TMP's visions and community needs. The focus of the 2012 update was to ensure that the CIP is accurate, up-to-date, and more user-friendly than previous versions by refining project rankings, better identifying a fiscally constrained list and assisting with the project selection process for funding and grant applications. The update also supported the action steps specified in the 2011 TMP. This is an administrative update to the CIP.[3]

The CIP is updated periodically (approximately every two years); an update to this study is currently in progress.

West Elizabeth Corridor: Several CIP improvement projects are within the West Elizabeth study area. One of these projects is to upgrade Elizabeth Street from Overland Trail to Taft Hill Road to two lane arterial standards. This project is a Tier 1 and has a "Medium" cost-adjusted category. A complete streets CIP project is to upgrade West Elizabeth Street from a two lane to a four lane arterial from Taft Hill Road to Constitution Avenue. The Transit CIP list includes Transit Signal Priority (TSP). Phase 3—vehicle replacement, new vehicles, and capital improvements (which includes Elizabeth BRT). Another project in the study area is to add bicycle lanes on West Elizabeth Street between Kimball Road and Ponderosa Drive.

This study applied "a wide breadth of evaluation criteria to ensure that the selected projects addressed specific transportation needs and also aligned with the City's core values."

[3] *www.fcgov.com/cip*

STUDENT HOUSING ACTION PLAN

(February 2013)

The Student Housing Action Plan's (SHAP) mission was to "strive to develop community-driven strategies that encourage and provide quality student housing while maintaining neighborhood quality and compatibility." The purpose of this effort was to work with stakeholders including Colorado State University (CSU), Front Range Community College (FRCC), neighbors, students, property owners, and developers to "identify strategies to address the increasing need for multi-family student housing; identify key issues for development or redevelopment; and understand potential impacts and compatibility issues." In particular, staff was asked to address developments near existing single-family residential neighborhoods. As a result of this, the following items have been adopted by City Council:

» Apply elements of the Land Use Code and the City's development standards for the Medium-Density Mixed-Use Neighborhood zone district. It should be applied to all multi-family projects outside of the TOD (transit–oriented development) Overlay Zone by incorporating those requirements into the general standards of the Land Use Code.

» Modify requirements in the Neighborhood Conservation zone district to restrict 100 percent secondary uses, such as residential development on land parcels of five acres or less, rather than the previous allowance of 10 acres or less.

» Require any multi–family project with greater than 50 units or 75 bedrooms to have a Type 2 Administrative Hearing.

West Elizabeth Corridor: The TOD Overlay Zone includes CSU's main campus and extends into the West Elizabeth ETC plan area east of City Park Avenue, between Plum Street on the north and Westward Drive on the south. This represents an area of the corridor that has seen redevelopment of single-family homes into large student oriented multi-family housing projects. Future development will be subject to the changes recommended in the SHAP. An action item in the report, still in need of further development before going to City Council for future implementation, is a grade-separated pedestrian/bicycle crossing at or near the intersection of Shields Street/West Elizabeth Street. This crossing is currently being analyzed as part of this effort in conjunction with the stadium IGA.

COLORADO STATE UNIVERSITY PARKING AND TRANSPORTATION MASTER PLAN *(April 2014)*

The CSU Parking and Transportation Master Plan goals includes providing strategies to improve overall campus access, to develop a more sustainable program of transportation alternatives, and improved customer service for the CSU community going forward. This plan included an overview of current parking management strategies, TDM (Transportation Demand Management) existing conditions and best practices, a community engagement and strategic communications plan, traffic impact assessment and traffic simulation model, PARK+ for campus parking and multimodal demand modeling.

West Elizabeth Corridor: The key recommendations in this plan relevant to the West Elizabeth Enhanced Travel Corridor Plan study area are as follows:

- Adopt a lower parking space to population ratio as the key parking planning benchmark.
- Develop an aggressive Transportation Demand Management (TDM) and Transportation Alternatives Program.
- Prioritize short-term parking development projects.
- Integrate the new Around the HORN Internal Campus Circulator Shuttle in conjunction with the inauguration of the MAX Bus Rapid Transit Service and transit route enhancements by Transfort.
- Determine parking pricing options and mobility management support.
- Develop strategic communications, campus parking and mobility program branding and marketing and ongoing program monitoring and benchmarking.
- Expand local and regional transportation planning and funding strategies.
- Adopt a range of new parking and planning technologies.
- Leverage parking and transportation to support campus sustainability and climate commitment goals.

INTERGOVERNMENTAL AGREEMENT RELATED TO AN ON-CAMPUS STADIUM

As a part of the CSU On-Campus Stadium, an intergovernmental agreement (IGA) was developed between CSU and the City in March 2015 to identify mitigation needs and recommendations for transportation during events. Mitigation needs and recommendations include transportation, parking and transit operational strategies, and multimodal transportation infrastructure.

West Elizabeth Corridor:
Strategies and improvements that will affect West Elizabeth Street include increased transit service (10 minute headways) and lane improvements at the West Elizabeth Street/ Shields Street intersection. An action item in the report, still in need of further development before going to City Council for future implementation, is a grade-separated pedestrian/ bicycle crossing at or near the intersection of Shields Street/ West Elizabeth Street.

TRANSIT-ORIENTED DEVELOPMENT PARKING STUDY

(November 2014)

The Transit Oriented Development (TOD) Parking Study identifies modifications to the TOD Overlay Zone standards adopted in 2006. The 2006 standards removed minimum parking requirements for mixed-use and multi-family dwellings in order to incentivize redevelopment on infill sites and investment in the MAX Corridor. The 2014 update was in response to increased development activity in the overlay zone, which caused a perceived lack of development-provided parking and consequent spillover into adjacent neighborhoods.

This plan makes five recommendations based on these problems:

- » Minimum parking requirements based on land use
- » Alternative compliance based on parking demand mitigation strategies
- » On-street paid parking
- » Public-private partnerships for parking structures
- » Monitor effects of MAX on parking in the long-term

West Elizabeth Corridor:
In the project study area, West Elizabeth Street and Plum Street between Shields Street and City Park Avenue are part of the TOD overlay zone.

FORT COLLINS BICYCLE MASTER PLAN

(December 2014)

The 2014 updated Bicycle Master Plan defined the vision of Fort Collins as a world-class city for bicycling where people of all ages and abilities have access to a comfortable, safe and connected network of bicycle facilities and where bicycling is an integral part of daily life and the local cultural experience.

The Bicycle Master Plan sets a number of goals for bicycling in Fort Collins in 2020 including:

- 20 percent of people commuting by bike
- Zero bicycle fatalities
- Fewer bicycle crashes than in 2014
- A 162 mile network of low-stress bikeways
- 80 percent of residents living within ¼ mile of a low-stress bike route

The plan emphasizes a low-stress network of connected bike facilities throughout the City.

West Elizabeth Corridor: This plan identifies the low-stress corridors that parallel West Elizabeth Street, as well as specific facility types for various streets in the study area; these include:

- West Elizabeth Street from Shields Street to Overland Trail is designated as a protected bike lane
- Shields Street within the study area is also designated as a protected bike lane
- Plum Street from Shields Street to West Elizabeth Street (including Constitution Avenue) is identified as a buffered bike lane
- City Park Avenue within the study area is designated as a neighborhood greenway.
- The Bicycle section of this report builds off the analysis and methodology applied in the Bicycle Master Plan.

COLORADO STATE UNIVERSITY BICYCLE MASTER PLAN

(September 2014)

The CSU Bicycle Master Plan analyzes current policies, program and infrastructure and provides best practices as seen at peer institutions. The plan intends to improve bicyclists' experience and safety on campus by prioritizing investment, recommending ongoing data collection and guiding bicycle incorporation into new buildings.

West Elizabeth Corridor: This plan identifies intersection improvements at West Elizabeth Street and Shields Street as a medium priority project. It also recommends an improvement to the intersection of Pitkin Streets, Shields Street and Springfield Drive to create a comfortable and safe crossing as a medium priority project.

WEST CENTRAL AREA PLAN *(WCAP) (March 2015)*

The West Central Area Plan provides a land use and transportation vision for the neighborhoods bound by Taft Hill Road, Drake Road, Mason Street and Mulberry Street. The plan proposed policies, projects and programs to improve the quality of life in the area by updating the 1999 West Central Area Plan. The transportation component features challenges, issues and opportunities associated with the transportation infrastructure. The report highlights three corridors: Prospect Road, Lake Street and Shields Street. The work done at the intersection on Shields Street and Elizabeth Street will carry forward into the West Elizabeth Enhanced Travel Corridor Master Plan.

West Elizabeth Corridor:
An action item of WCAP was the development of the West Elizabeth Enhanced Travel Corridor Plan. WCAP also contains an analysis of Shields corridor from Laurel Street to Prospect Road. The analysis of Shields is continuing within the West Elizabeth Street ETC plan.

Some additional action items in WCAP that are relevant to the West Elizabeth study area include:

- Shared-use parking opportunities for transit users
- Additional transit service
- Bus stop improvements
- Intersection improvements at Shields Street/West Elizabeth Street and City Park Avenue/West Elizabeth Street
- Roadway improvements on West Elizabeth Street between Shields Street and City Park Avenue.

WCAP includes a detailed analysis of the Prospect Corridor between Shields Street and College Avenue. The design in this section of the plan recommends a widened sidewalk, tree lawn, bike lane and sections of shared use path This cross section will inform the discussion within the West Elizabeth study area.

TRAFFIC SAFETY SUMMARY *(APRIL 2015)*

This report summarizes the traffic crash history from 2010 to 2014 that have occurred on public streets throughout Fort Collins. It includes a summary of crashes, evaluation of the most common types of crashes, and identification of locations with a high frequency of crashes.

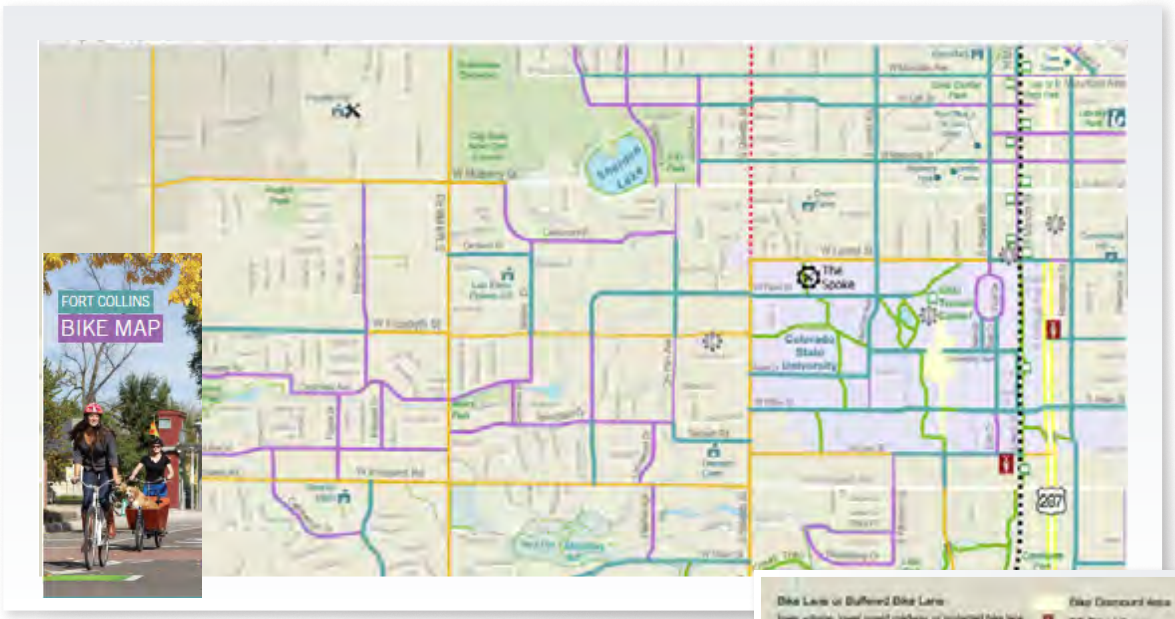
West Elizabeth Corridor: The Traffic Safety Summary is the primary source of data used in the West Elizabeth Corridor analysis detailed in the Safety section of this document.

FORT COLLINS BIKEWAY SYSTEM MAP *(June 2015)*

The Fort Collins bikeway system map, as shown in **Figure 9,** was updated in 2015 to show the most recent existing and proposed soft-surface multi-use trails, hard-surface multi-use trails, bike lanes, and designated bike routes. This map was published and is being widely distributed to ease route planning for bicyclists navigating Fort Collins. This is an updated version of the previous Fort Collins bike map that provides additional emphasis on low-stress routes.

West Elizabeth Corridor:
There are a number of on-street, off-street or designated bike route bicycle facilities within the West Elizabeth Enhanced Travel Corridor Plan area that connect to the surrounding neighborhoods.

FIGURE 9: Bikeway System Map



OLD TOWN NEIGHBORHOODS PLAN *(Ongoing)*

The Old Town Neighborhoods Plan is an update of the Eastside and Westside Neighborhoods Plans and will help establish a vision for the future of this area. The Plan will be used to help guide neighborhood character, policies and investment. This updated plan allows the neighborhoods to shape or reconfirm the neighborhood's vision, goals, and policies to reflect current and future conditions.

The Plan will explore neighborhood character, land use, transportation and mobility, housing and open space. Key focus areas will include:

- Development within comprising districts
- Existing conditions and options for the Mulberry & North Shields arterial corridors
- Neighborhood Design Guidelines & Pattern Book

West Elizabeth Corridor:
The design concepts developed in this plan for Mulberry Street between Taft Hill Road and Shields Street is within the West Elizabeth study area and will affect connections recommended as a part of this plan.

Section 3

EXISTING CONDITIONS

Existing right-of-way varies considerably throughout the corridor and can be characterized into three distinct areas from west to east: Overland Trail to Taft Hill Road, Taft Hill Road to Constitution Avenue, and Constitution Avenue to Shields Street. As a result, West Elizabeth varies between a two-lane and four-lane arterial.

EXISTING CONDITIONS

EXISTING RIGHT-OF-WAY

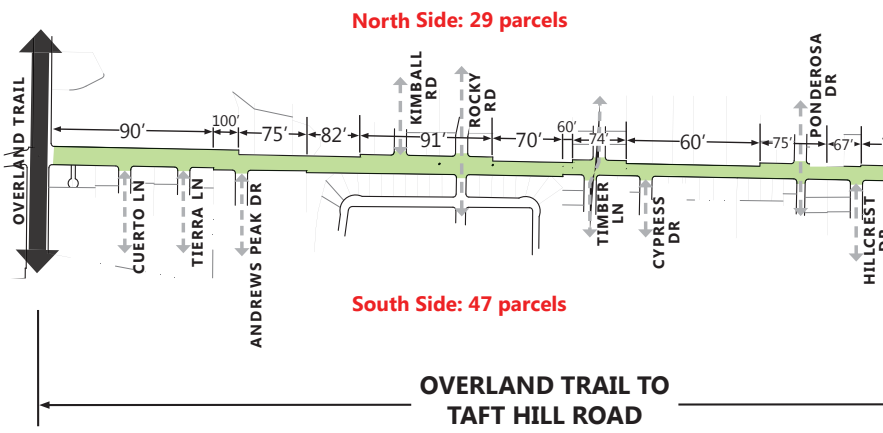
West Elizabeth varies between a two-lane and four-lane roadway. In general, the roadway has two travel lanes between Overland Trail and Constitution Avenue and four travel lanes between Constitution Avenue and Shields Street, though a second eastbound travel lane begins west of Constitution Avenue near Skyline Drive.

Overland Trail to Taft Hill Road – varies from 60 feet to 100 feet. The right-of-way in this area is inconsistent overall due to many of the northern parcels being annexed into the City Limits from Larimer County, and right-of-ways remaining as they were in the County. Many of these parcels take direct access off of Elizabeth Street, and the parcels vary considerably in width.

Taft Hill Road to Constitution Avenue – varies from 75 feet to 90 feet. The right-of-way in this area is relatively consistent, mostly exceeding 80 feet in width. A number of single-family parcels take direct access off of West Elizabeth Street.

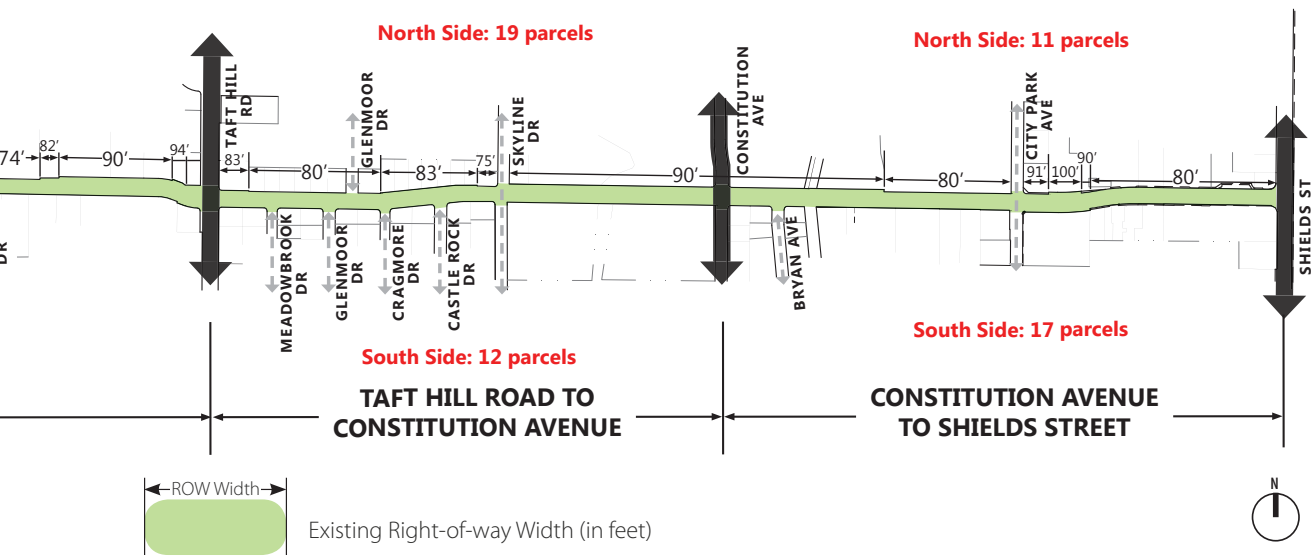
Constitution Avenue to Shields Street – varies from 80 feet to 100 feet. The right-of-way in this area is a minimum of 80 feet with approximately 50 percent of the area exceeding this. Multi-family adjacent parcels do not take direct access off of West Elizabeth Street, however, nearly all commercial parcels access directly off of West Elizabeth Street.

FIGURE 10: Existing Right of Way



EXISTING CROSS SECTIONS

The cross section along the West Elizabeth Street corridor varies between Shields Street and Overland Trail. Similar to right-of-way, there are three primary variations of cross sections. The three locations that exemplify each of the cross sections are shown in **Figure 11. Figure 11** also shows the location of the cross sections at Plum Street, City Park Avenue and Constitution Avenue. The cross sections along West Elizabeth Street are shown in **Figure 12.** The eastern-most cross section on West Elizabeth Street has four travel lanes, a center turn lane, a 7 foot bike lane that is a flush, single-pour concrete, and a 12-foot sidewalk on either side that includes an amenity zone. Between Skyline Drive and Taft Hill Road, the cross section has two travel lanes, a center turn lane, a 6.5 foot bike lane that includes a 2 foot gutter, and a 3.5 foot sidewalk. The western-most cross section has two travel lanes, a 6.5 foot bike lane including a 2 foot gutter (in most sections) , and a 5 foot sidewalk with a wide 10 foot landscaped buffer (south side only). The cross sections along Plum Street, City Park Avenue and Constitution Avenue are shown in **Figure 13.** Plum Street also has two travel lanes, with a 5 to 6 foot bike lane and an 8 foot sidewalk on both sides, City Park Avenue has two travel lanes, on street parking, a 5 foot attached sidewalk on both sides and a bike lane. Constitution Avenue has two travel lanes, a 5 foot bike lane and 4 foot detached sidewalk with a 5 foot landscaped buffer on both sides.



Source: City of Fort Collins document survey and parcel data.

FIGURE 11: Existing Cross Section Index

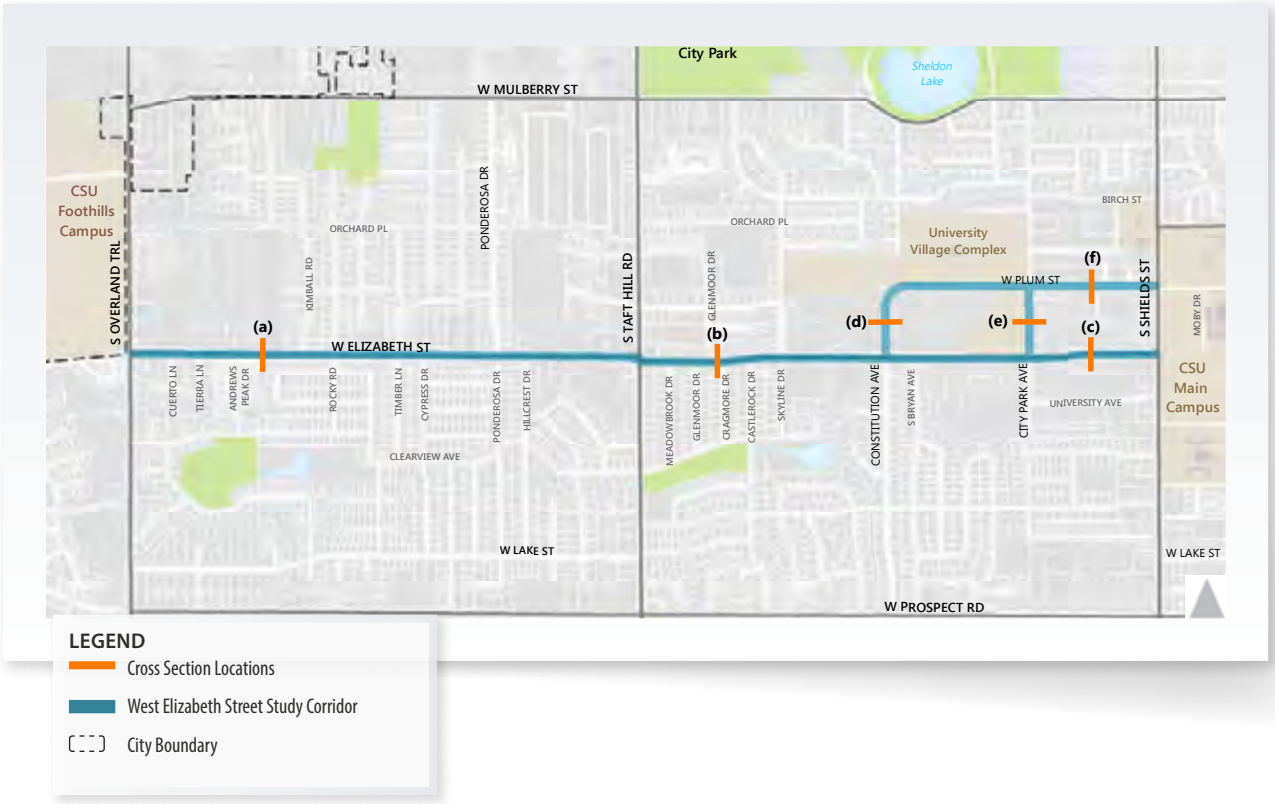
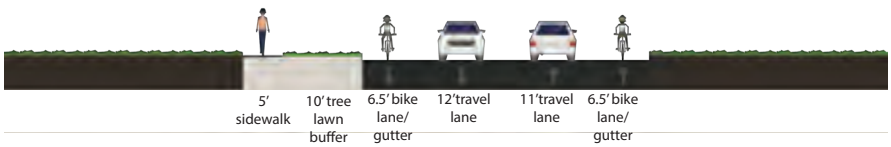
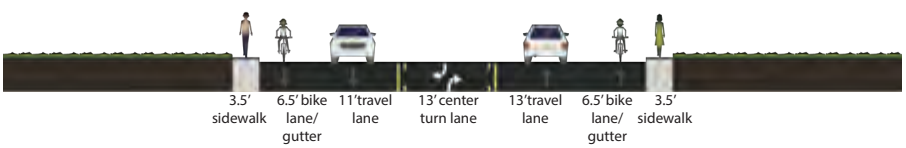


FIGURE 12: West Elizabeth Street Existing Cross Sections

a. West Elizabeth Street between Kimball Drive and Overland Trail



b. West Elizabeth Street between Skyline Drive and Taft Hill Road



c. West Elizabeth Street between Shields Street and City Park Avenue

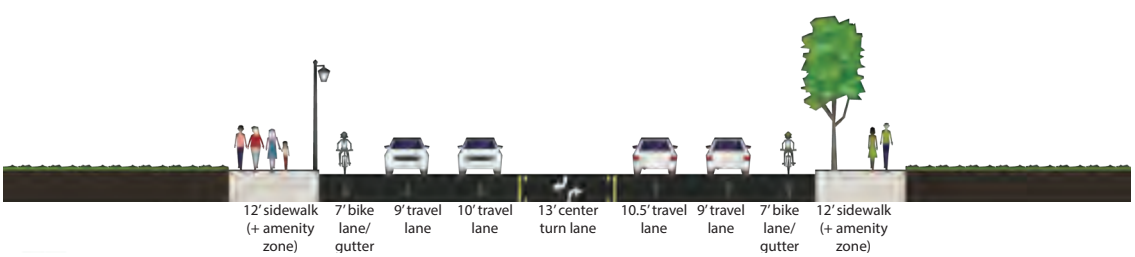
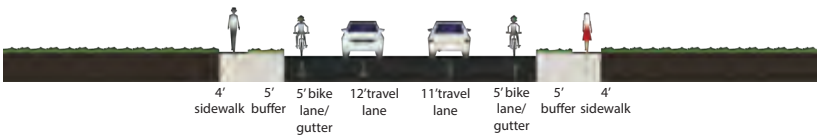
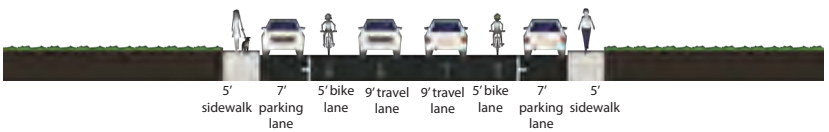


FIGURE 13: Plum Street, City Park Avenue and Constitution Avenue Existing Cross Sections

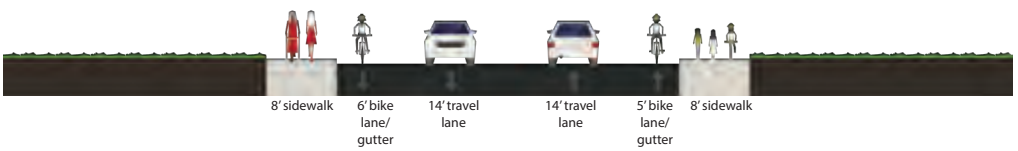
d. Constitution Avenue between Plum Street and Elizabeth Street



e. City Park Avenue between Plum Street and Elizabeth Street



f. West Plum Street between Shields Street and City Park Avenue



VEHICLES

This section analyzes the performance of the West Elizabeth Street study area for vehicles. The findings from this analysis provide a framework for shaping recommendations in the corridor. This section identifies existing and future traffic volumes that may inform travel lane needs in the corridor and operations issues at intersections that may inform improvements at study intersections. Key items documented in this section include a summary of traffic volumes in the study area, vehicle level of service calculations for study intersections, and 2040 traffic volume forecasts.

Figure 14 shows average daily traffic, peak hour vehicle movements, and lane configurations. Counts were provided by the City of Fort Collins Traffic Operations.

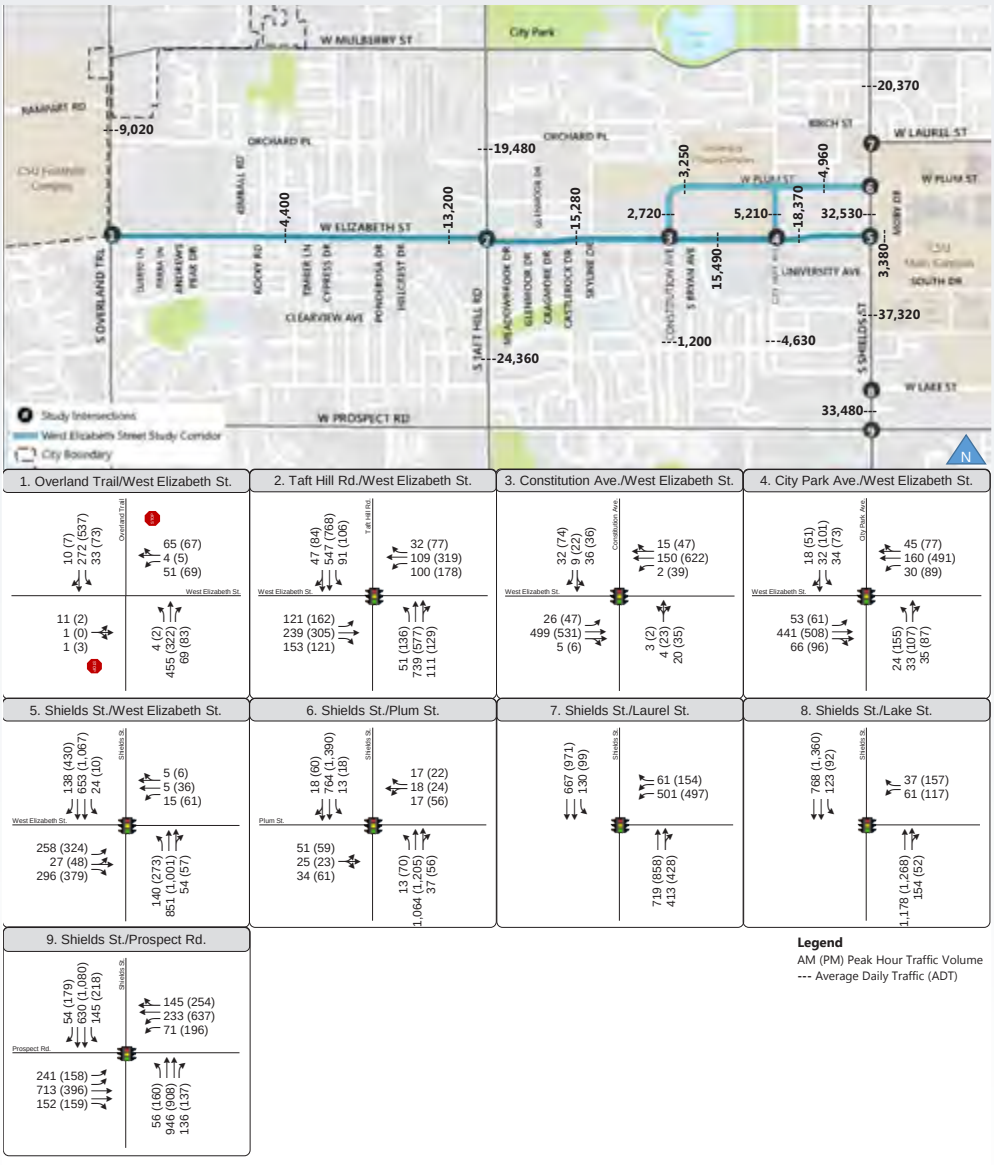
Intersection level of service (LOS) was calculated using Vissim, a microscopic multimodal traffic flow simulation software package. The Vissim model was created to represent West Elizabeth Street between Overland Trail and Shields Street, Shields Street between Mulberry Street and Prospect Road and Plum Street between Constitution Avenue and Shields Street. All of the West Elizabeth Enhanced Travel Corridor Plan intersections are included in the Vissim model.

The Vissim model was calibrated to existing traffic counts (including automobiles, transit vehicles, bicyclists, and pedestrians), travel times collected using Bluetooth detection, and observed phase green times at each signalized intersection. **Appendix B** includes detailed validation statistics.

Vissim simulates interactions between different modes of transportation, including vehicle-pedestrian and vehicle-bicyclist interactions. In a corridor with high volumes of transit vehicles, pedestrians, and bicyclists, capturing these interactions is important for understanding operations and level of service for all modes.

Vissim simulates interactions between different modes of transportation, including vehicle-pedestrian and vehicle-bicyclist interactions.

FIGURE 14: Existing Conditions Turning Movements and Lane Configurations



EXISTING CONDITIONS

Level of Service (LOS)

Level of service on West Elizabeth Street and Shields Street is displayed in **Table 1** and shown in **Figure 15. Table 1** shows average intersection and delay at each study intersection, and the appendix includes delay by approach and movement.

LOS for signalized intersection is based on average vehicle delay on all approaches which can conceal the high delay (poor LOS) conditions at specific approaches that may have a small percentage of the intersection's overall volume. Intersections with such higher delay on specific approaches include:

- **West Elizabeth Street/Shields Street –** the eastbound approach operates at LOS E during the PM peak hour. The northbound left turn operates at LOS F.
- **Shields Street/Plum Street –** the eastbound approach operates at LOS E during the AM peak hour; both the eastbound and westbound approaches operate at LOS E during the PM peak hour.
- **Shields Street/Laurel Street –** the westbound approach operates at LOS E during the PM peak hour.
- **Shields Street/Prospect Road –** the eastbound approach operates at LOS F during the AM peak hour; the westbound approach operates at LOS F during the PM peak hour.

TABLE 1: Existing Conditions Intersection Level of Service

Intersection	Control	Existing Conditions			
		AM		PM	
		Delay *(seconds)*	LOS	Delay *(seconds)*	LOS
West Elizabeth Street/Overland Trail	Side-Street Stop[1]	3 *(average)* 23 *(westbound left)*	A C	3 *(average)* 27 *(westbound left)*	A D
West Elizabeth Street/Taft Hill Road	Signal [2]	22	C	34	C
West Elizabeth Street/ Constitution Avenue	Signal	6	A	9	A
West Elizabeth Street/City Park Avenue	Signal	8	A	15	B
West Elizabeth Street/Shields Street	Signal	18	B	42	D
Shields Street/Plum Street	Signal	9	A	14	B
Shields Street/Laurel Street	Signal	12	B	24	C
Shields Street/Lake Street	Signal	7	A	12	B
Shields Street/Prospect Road	Signal	67	E	51	D

[1]Delay for side street stop intersections is provided both for the worst case movement as well as the average of all movements.
[2]Delay for signalized intersections is provided for the average of all movements.

There are a large number of access points on West Elizabeth Street, resulting in frequent driveway conflicts, especially between Shields Street and Constitution Avenue.

Speed and Travel Time
Speed data was collected on West Elizabeth Street mid-block between City Park Avenue and Constitution Avenue. The 85th percentile eastbound and westbound speeds at this location were 37 mph and 33 mph respectively. The posted speed limit is 30 mph.

Table 2 shows a comparison of the VISSIM model travel times on West Elizabeth and the actual travel times based on Bluetooth data.

FIGURE 15: Vehicle Level of Service (LOS)

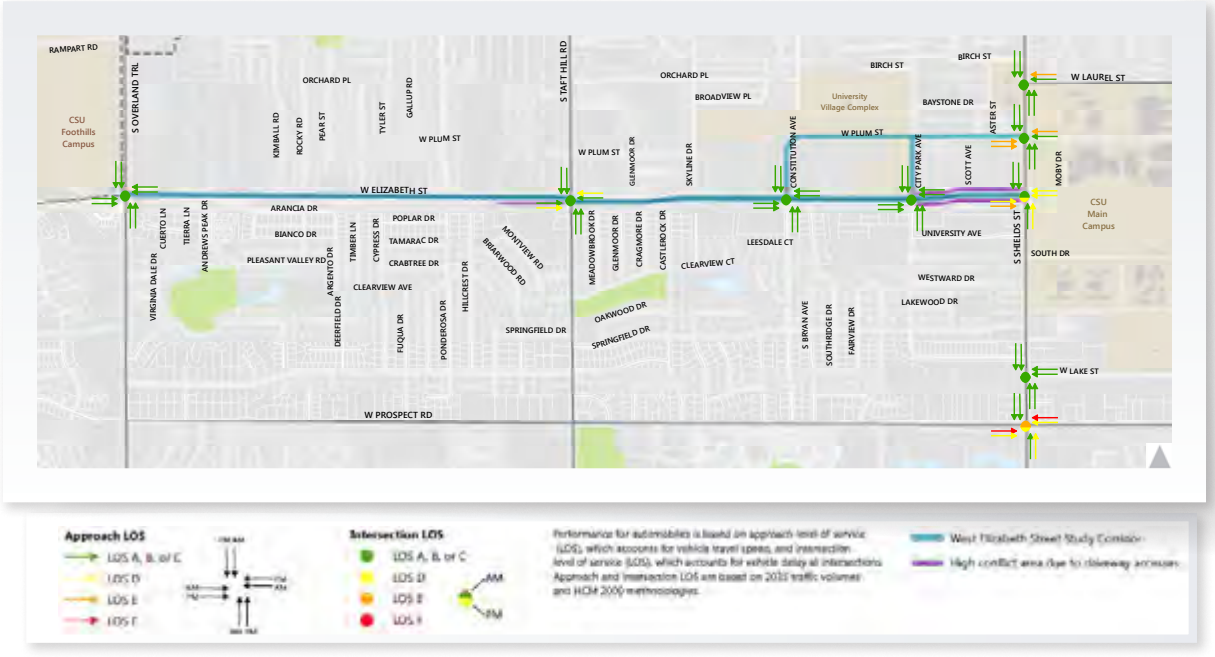


TABLE 2: West Elizabeth Street Travel Time

Roadway Segment	Time Period	Travel Time	
		VISSIM *(seconds)*	Bluetooth *(seconds)*
EB Taft Hill to Constitution	AM	65	54
	PM	68	55
EB Constitution to Shields	AM	101	86
	PM	122	112
WB Shields to Constitution	AM	72	67
	PM	81	73
WB Constitution to Taft Hill	AM	97	71
	PM	14	86

FUTURE CONDITIONS

(2040)

The North Front Range Regional Travel Model (NFR Model) was used to estimate traffic volumes in 2040. The NFR Model's roadway network includes the City of Fort Collins as well as the cities of Loveland, Windsor and Greeley. The NFR Model is calibrated to 2012 conditions and contains future year data reflecting 2040 economic and demographic forecasts and specific transportation projects expected to be constructed by 2040. Within the West Elizabeth Enhanced Travel Corridor Plan study area the model contains a low level of detail; therefore, the model was used to develop growth rates that were used to develop 2040 turning movement forecasts.

Specifically, the model projects the following growth rates from 2012 to 2040:

» West Elizabeth Street – 23 percent (0.8 percent per year) during the AM peak hour and 12 percent (0.5 percent per year) during the PM peak hour.

» Shields Street – 16 percent (0.6 percent per year) during the AM peak hour and 19 percent (0.8 percent per year during the PM peak hour.

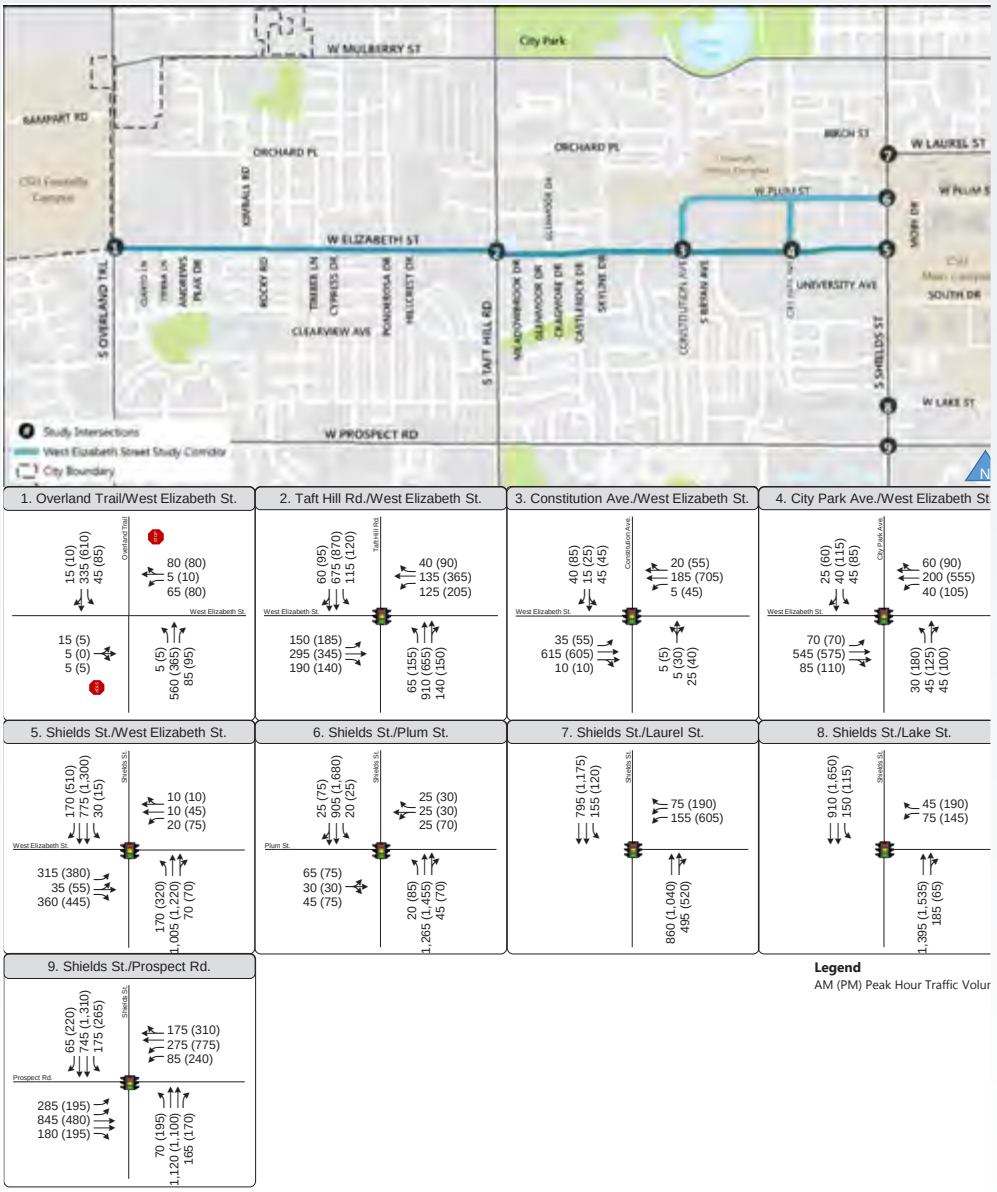
These growth rates were applied to intersection turning movements on West Elizabeth Street and Shields Street. At the West Elizabeth Street/Shields Street intersection the West Elizabeth Street growth rates were applied to the east-west through movements on West Elizabeth Street; the Shields Street growth rates were applied to the north-south through movements on Shields Street and an average of the two growth rates was applied to turning movements.

These 2040 forecasts for the study area generally assume a 0.53 percent annual growth in population and 0.33 percent annual growth in employment with no major changes to existing transit service or walk/bike mode share. Improvements that serve to significantly improve transit service or conditions for pedestrians and bicyclists may justify modified forecasts. This will be explored further as part of the alternatives analysis.

Figure 16 shows the 2040 peak hour turning movement forecasts.

2040 traffic operations analysis will be included in the alternatives analysis.

FIGURE 16: 2040 Conditions Turning Movements and Lane Configurations



PARKING

The study area, especially between City Park Avenue and Shields Street, has a high demand for parking given its proximity to the CSU campus and amount of commercial properties and dense, multi-family and student housing. There are a few sections of on-street parking within the additional corridor study segments. These sections are:

- On City Park Avenue between Plum Street and West Elizabeth Street
- On some short segments of West Elizabeth Street west of Taft Hill Road
- Residential streets north of Plum Street
- Residential streets north of Elizabeth Street
- Residential streets south of Elizabeth Street

There are some areas of off-street parking in the study area. These are primarily located at commercial and multi-family properties west of Shields Street and the single-family neighborhoods within the study area. The Campus West area faces a parking shortage due to the large number of vehicle trips generated by CSU, the dense student population with cars living in the neighborhood, and the number of businesses located on West Elizabeth Street between Shields Street and Constitution Avenue. As of July 2015, there are parking restrictions on CSU campus but no Residential Parking Permit Program in the study area. Some property owners have developed shared parking agreements with adjacent property owners. A complete list of these agreements is not available.

KEY FINDINGS

Traffic volumes on West Elizabeth Street generally increase from west to east. Near Timber Lane the ADT is 4,400 vehicles per day and near Shields Street the ADT is over 18,000 vehicles per day.

Traffic volumes on area collectors Plum Street (4,960 vehicles per day), Constitution Avenue (2,720 vehicles per day), and City Park Avenue (5,210 vehicles per day) are lower than the traffic volumes on West Elizabeth Street.

Most study intersections operate at LOS D or better during peak hours. The Shields Street/Prospect Road intersection operates at LOS E during the AM peak hour.

Key approaches to certain intersections experience notable congestion: the northbound left-turn, eastbound left-turn, and eastbound right-turn at the West Elizabeth Street/Shields Street intersection and the eastbound and westbound movements at the Plum Street/Shields Street intersection.

By 2040 and without other significant changes to transit service or conditions for pedestrians and bicyclists, traffic volumes on West Elizabeth Street are expected to grow approximately 23 percent (0.8 percent per year) during the AM peak hour and 12 percent (0.5 percent per year) during the PM peak hour.

There are a large number of access points on West Elizabeth Street, resulting in a number of driveway conflicts, especially between Constitution Avenue and Shields Street.

TRANSIT

This section analyzes the performance of Transfort services in the West Elizabeth Street study area in order to develop a data-driven understanding of the local network. The findings from this analysis provide a framework for shaping both short-term and longer-term recommendations on the corridor. More specifically, this section identifies opportunities to improve service quality, maximize the use of Transfort resources, continue ridership growth, and address unmet mobility needs both today and as the corridor continues to develop.

This section begins with an overview of the Transfort network of services and the local operating environment. This provides context for understanding Transfort's current role. This section then assesses the key routes that serve the study area. It describes the design decisions that shape these services, and the impact that these decisions have on performance across different metrics. This section concludes with a summary of key findings that will help form a framework for achieving the corridor vision.

Data Sources

This analysis utilizes monthly Transfort service performance data to evaluate weekday performance at the study area and route level. For time period analysis and stop level analysis, this analysis uses Trip Summary and Automated Passenger Counter (APC) ridership data, respectively. Route profiles and the analysis of Saturday performance are included in **Appendix C.**

Context

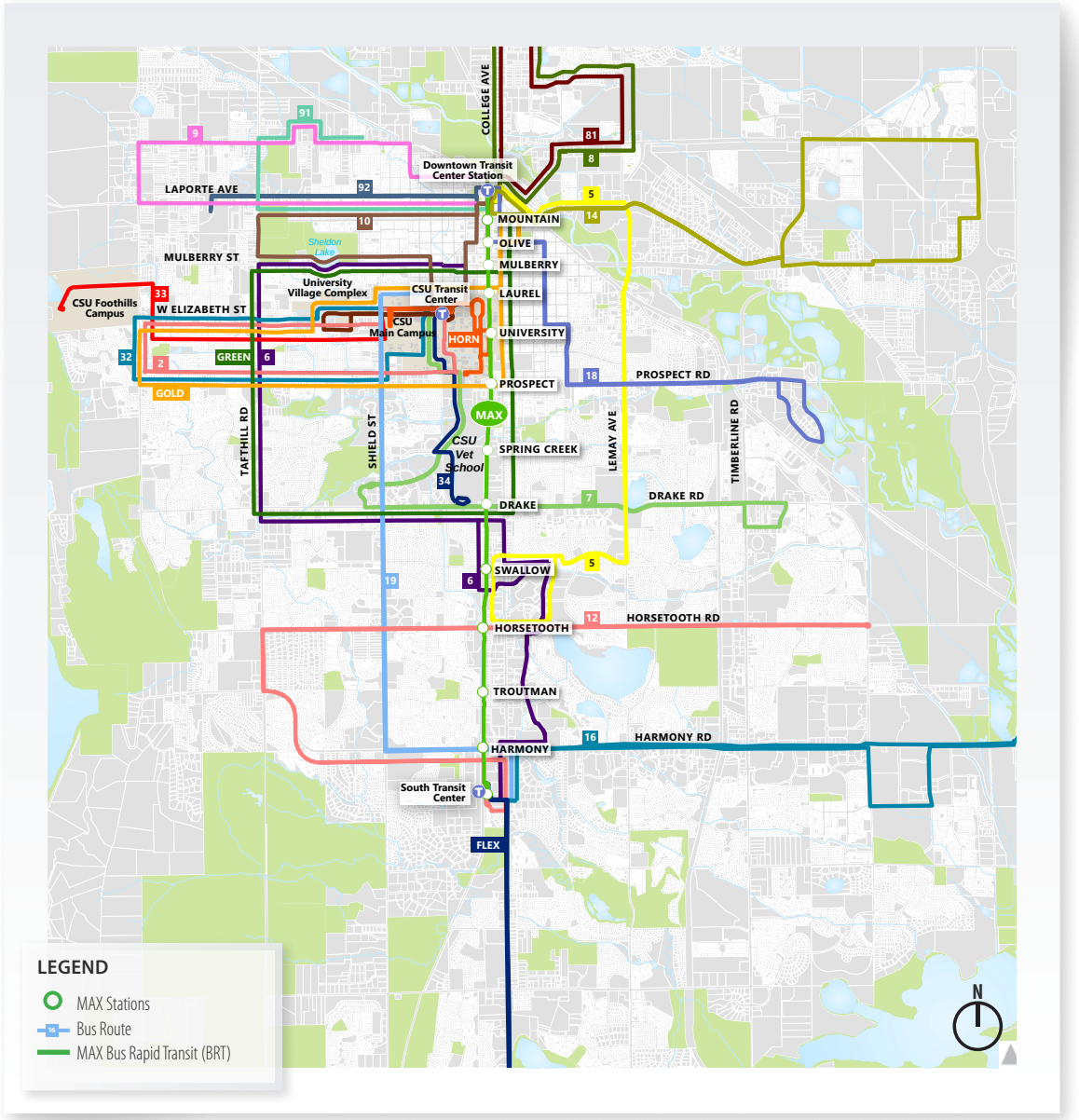
Transfort Network Overview

Transfort is a department within the Planning, Development, and Transportation service area for the City of Fort Collins. The agency operates 24 fixed-routes to serve the City of Fort Collins. Local and shuttle routes provide community circulation and often feed into MAX, a high-frequency BRT and critical network spine. FLEX is a regional service with connections to Loveland, Berthoud, and Longmont.[4] Transfort also operates Gold and Green Routes, which are two weekend evening/late-night circulators.

Figure 17 shows Transfort's system map. Transfort has designed a hybrid grid/hub-and-spoke network. This service structure is typically utilized in areas with lower service frequencies. It allows passengers to transfer between routes at hub locations, often via timed transfers while still maintaining a grid configuration where strong mixed use corridors are present. Transfort's hub-and-spoke network features three major transfer hubs: the Downtown Transit Center, the CSU Transit Center, and the South Transit Center. Many Transfort services connect to one of these hubs.

[4] *Extended service to Boulder is expected to begin January 2016.*

FIGURE 17: Transfort System Map



Overall, the study area route network is confusing, with many routes providing overlapping service and different routes providing service in each direction on the same corridor (often with slightly different alignments). It is not surprising that the most productive and highest ridership routes are those that are the easiest to understand and use.

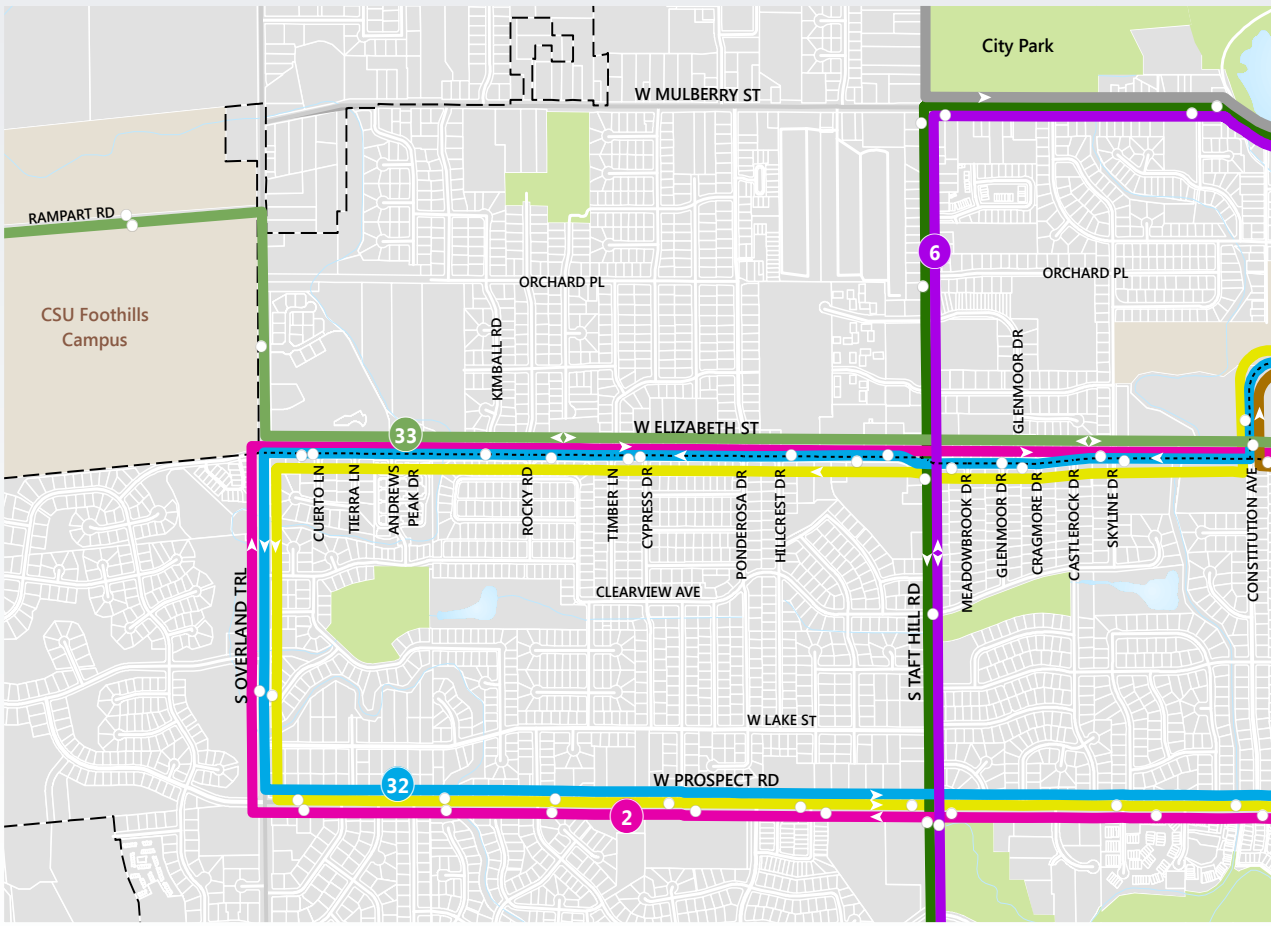
Certain routes only operate while CSU is in session such as the 31, 32, 3and 33. However, these services are funded primarily through a partnership with the University and Associated Students of Colorado State University (ASCSU) which mostly serve the needs of their students, faculty, and staff. While the routes are in operation they provide additional service frequency for the entire community that Transfort would not be able to otherwise offer.

Corridor Study Area

CSU heavily influences local demand for transit, its design, and ultimately, its performance. Universities are strong markets for transit because they typically attract a high concentration of households with limited access to vehicles. Understanding this operating environment will be critical for developing cost-effective transit solutions and identifying enhanced transit mobility options for the corridor.

The study focuses specifically on evaluating Routes 2, 6, 10, 19, 31, 32, 33, HORN, and MAX. These Transfort services have the most impact on mobility within the study area. Routes 2, 6, 10, 19, HORN, and MAX operate year around. Routes 31, 32, and 33, only operate when CSU is in session. The key hub in this area is the CSU Transit Center, the central hub for routes serving the university. **Figure 18** shows existing transit routes and stops in the study area.

FIGURE 18: Existing Transit Routes and Stops



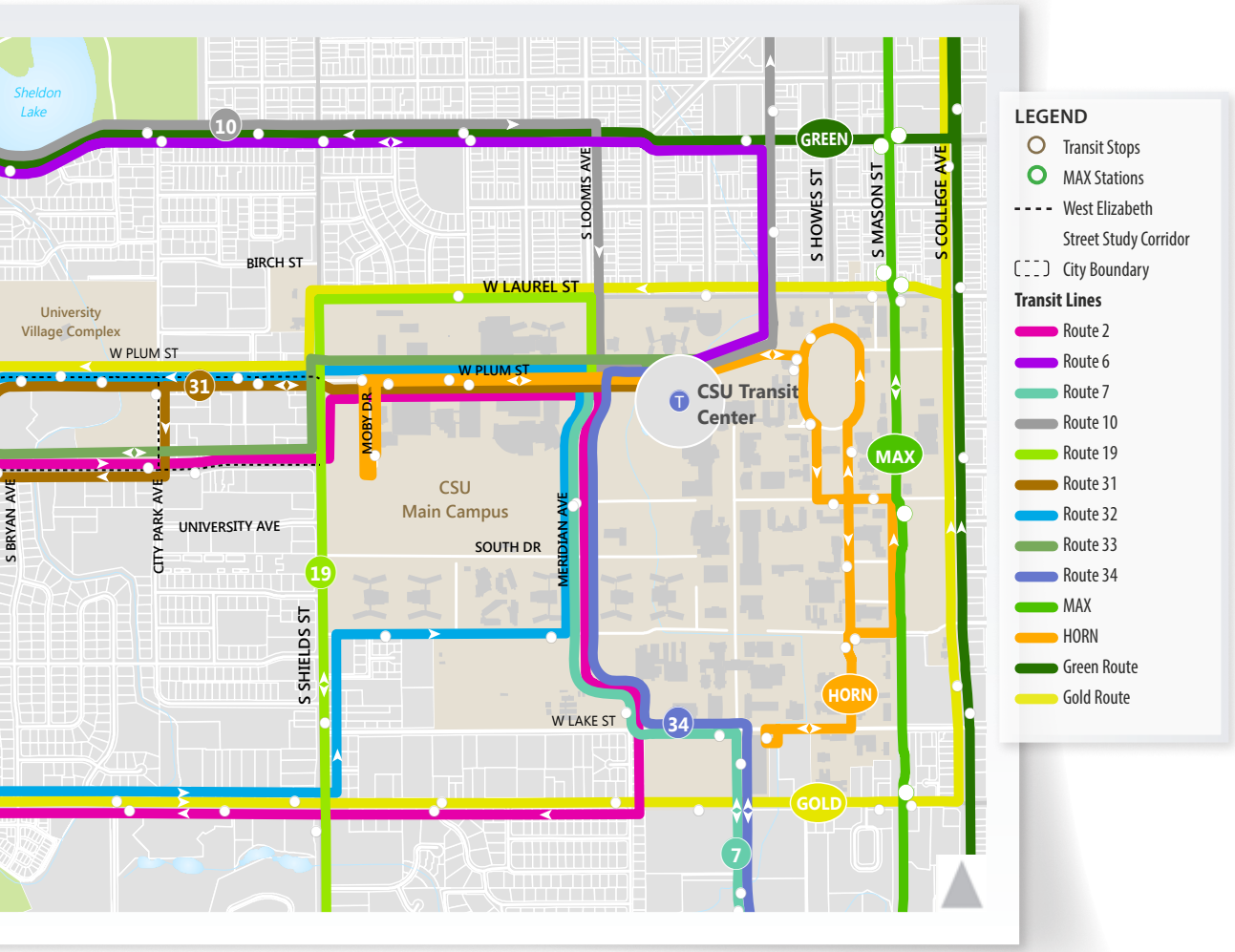
ROUTE CHARACTERISTICS

This section begins with an overview of the design decisions for the routes in the study area. Decisions on factors such as alignment, span, frequency, and infrastructure have significant impacts on a service's potential role and performance.

Route Descriptions

The nine Transfort routes in the study area each have a different role in providing regional, community, and neighborhood mobility.

Routes 2, 32, and 33 are the primary services on the West Elizabeth Street Corridor. Route 2 is a year-round service while Routes 32 and 33 provide additional overlay service when CSU is in session.



Route 31 is a high-frequency, walk extender that operates on Plum Street, a three-minute walk from West Elizabeth Street.

The HORN also operates on Plum Street from Moby Arena through the CSU Transit Center to provide campus circulation to East Drive, the Mason Corridor, and the Lake Street Parking Garage.[6]

Route 10 is an hourly, one-way loop that runs north of the CSU Transit Center to downtown Fort Collins.

Routes 6 and 19 offer a north-south connection between CSU and the South Transit Center via corridors such as Taft Hill Road and Shields Street.

MAX is the very frequent BRT spine that connects downtown Fort Collins and the South Transit Center along a linear corridor on the east end of the University's main campus. Transfort launched MAX and a redesigned service network in 2014 to fully leverage this new investment.

[6] During the next service change, the HORN will be extended further south to serve the CSU Veterinary School and will replace Route 34.

Frequency

Frequency is one of the most important attributes of a route because it influences both the attractiveness of a service[5] and the resources needed to operate it. At frequent service levels of every 15 minutes or better, service comes often enough that most riders will not have to consult a schedule to plan their trips; they simply show up at the bus stop. Frequent transit makes a sustainable mobility lifestyle viable in higher density communities.

Lifeline, or basic mobility, transit services operate at frequencies of every 60 minutes or less often. Such frequencies require that passengers plan their trips in advance and often increase overall wait times. Passengers of lower frequency services typically arrive at stops earlier in order to ensure that they make their trip. The limitations of basic mobility frequencies make it difficult for these services to perform productively or cost-effectively. These frequencies are usually reserved for lower-demand, coverage-based mobility markets.

Table 3 shows existing weekday frequencies for routes in the study area. These study area frequencies are heavily dependent on school demand. Overall service levels decrease when CSU or Poudre School District are not in session with Routes 31, 32, and 33 even ceasing operation during these periods. Transfort recognizes how much the university affects the demand for transit and Transfort's frequency decisions reflect these significant seasonal changes in market conditions.

TABLE 3: Transfort Route Frequencies

Route	Frequencies *(CSU in Session) (minutes)*		Change when CSU out of Session
	Peak *(AM/PM)*	Midday	
2	30	30	No change
6	60	60	No change
10	60	60	No change
19	30	60	60 minutes all day
31	10	10	Does not run
32	30	30	Does not run
33	30	30	Does not run
HORN	10	10	30 minutes all day
MAX	10	10	No change

[5] The top two attributes in attracting new customers are frequency and fast travel times in that order. Thus, fast, less frequent transit attracts fewer riders than a very frequent service with reasonable travel times. One that does both, like MAX, is highly attractive to consumers. Note that these attributes influence initial trial use of transit; delivering reliable, on-time service in sufficient capacity every day is the key to retaining customers.

Table 3 shows that routes in the corridor study area have a wide range of frequencies, from low basic needs frequencies (e.g., 60 minute frequency) to high "spontaneous use" frequencies (e.g., 10 minute frequency). This reinforces the notion that Transfort is willing to stratify its service product, which is an effective strategy. The highest frequency services are Route 31, HORN, and MAX. These services operate every 10 minutes during the day, attractive to transit lifestyle mobility needs. The lower frequencies services such as Routes 6 and 10 target lower density corridors and neighborhoods.

While Transfort has invested a high level of service in the immediate study area, this investment is spread across multiple routes and corridors. And in the case of West Elizabeth Street and Plum Street, the frequency investments are spread across two corridors less than ¼-mile apart. The Corridor Understanding Report will evaluate the impact this decision has on performance, efficiency, and the passenger experience.

Span

Service span describes the hours of operation for a transit service. A longer service span helps increase ridership by offering more trip opportunities and usually increases ridership at both ends of the trip, since expanded spans make round trips possible on transit. **Table 4** shows the service span for routes within the study area. Most of the services in the study area start just before 7 AM and end between 6 PM and 7:45 PM. This span effectively serves traditional work trips, school trips, and midday circulation. However, this limits other types of trips (e.g., service jobs, second shift, evening shopping) to just three routes in the study area that operate wider spans: Routes 2, 6, and MAX.

TABLE 4: Transfort Route Span

Route	Span *(CSU in Session)*	Change when *(CSU out of Session)*
2	6:22 AM - 10:00 PM	No change
6	6:06 AM - 10:18 PM	No change
10	6:45 AM - 7:08 PM	No change
19	6:52 AM - 7:43 PM	No change
31	6:58 AM - 6:20 PM	Does not run
32	6:50 AM - 6:40 PM	Does not run
33	6:52 AM - 5:49 PM	Does not run
HORN	6:42 AM - 6:38 PM	No change
MAX	5:10 AM - 12:16 AM	No change

Fares

The fare structure affects a system's ability to attract riders, generate revenue, and stay financially sustainable. **Table 5** shows Transfort fare groups. At the time of this report, revenue data was not available to fully evaluate financial performance at the route level. In addition to passenger fare revenue, Transfort receives funding from Colorado State University that allows CSU students, faculty, and staff to ride for free.[7] The free fares allow students, faculty, and staff to use transit as part of their lifestyle mobility (augmenting walking and biking).

TABLE 5: Transfort Fare Groups

Fare Group	Single Ride Fare	Annual Pass Price
Adult	$1.25	$154
Seniors	$0.60	$25
Disabled and Medicare	$0.60	$25
Youth	Free	Free
CSU Students, Faculty, and Staff	Free	Free
Transfers	Free	N/A
Late-Night Downtown Service	$1.00/$0.50	N/A

[7] *Technically, the students do not ride for free, but pre-pay for transit as part of their student fees.*

EVALUATION OF EXISTING SERVICES

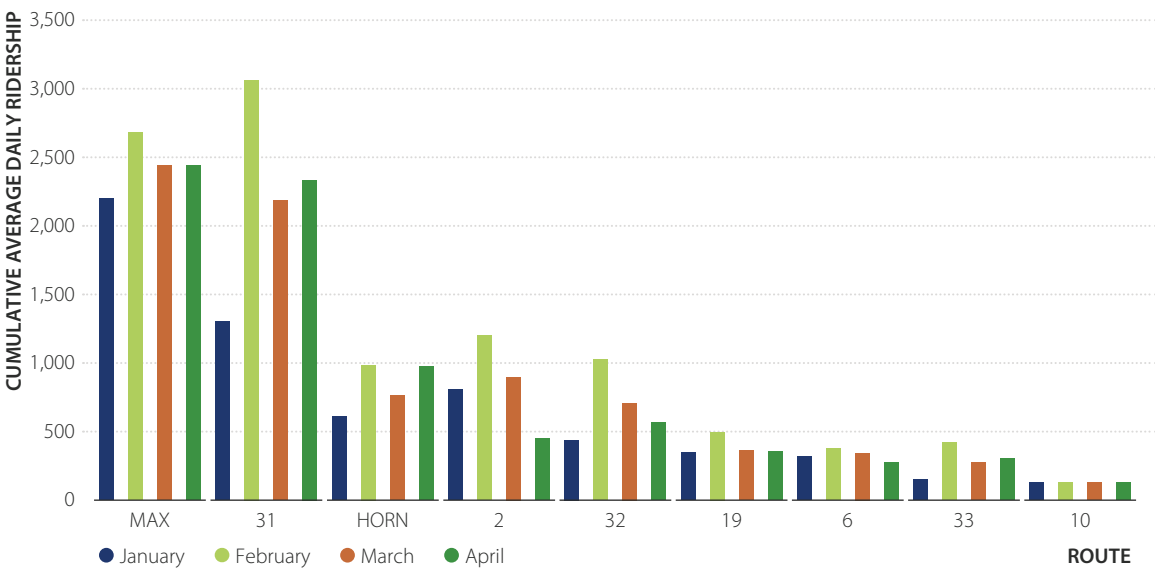
This section evaluates the performance of the system within the study area[8] across different metrics. The observed performance is the result of many factors, including service design decisions and local market conditions. The findings from this analysis provide insight into existing strengths and opportunities for improvement.

Ridership

System Ridership

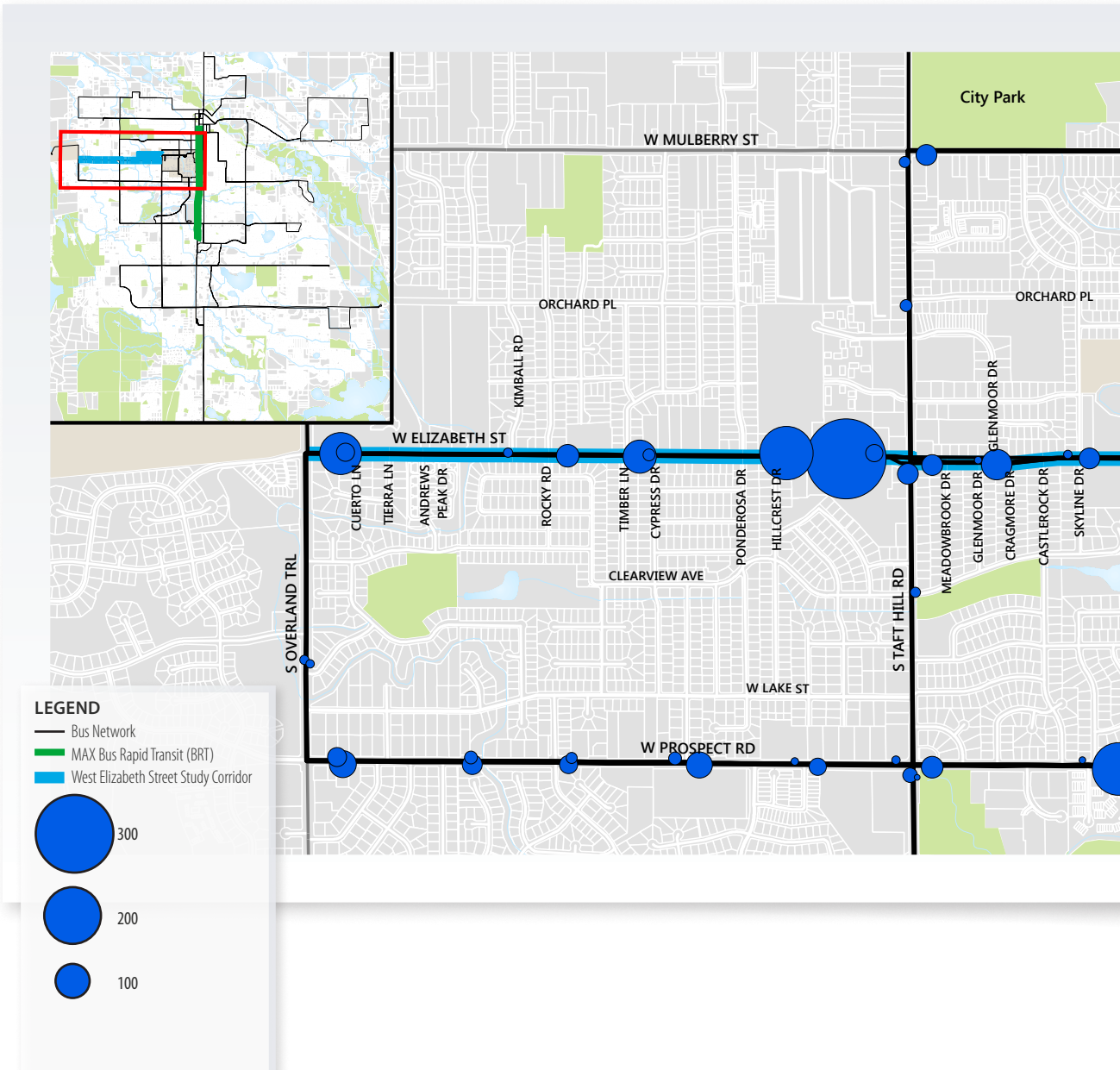
Figure 19 displays the average weekday ridership for all of the routes in the study area. The data shows the influence of Colorado State University on transit demand. The University's spring semester did not start until January 20, 2015. As a result, Routes 31, 32, and 33 did not operate until that date, and overall ridership volumes were down for the month. With the exception of a spring break from March 15-22, school was continuously in session until May 15, 2015. Additionally, ridership is higher during the beginning of the semester when the weather is colder and before students start dropping classes. The Corridor Understanding Report is based on data between January and April in order to get a more consistent understanding of peak, school-based demand. Between January and April, the Transfort routes serving the study area, not including MAX, averaged 8,700 passenger boardings per weekday. Approximately 4,500 of these total passenger boardings originated within the study area.

FIGURE 19: Average Weekday Ridership Chart (Transfort routes serving the study area)



[8] *Ridership data is from January 2015-April 2015.*

FIGURE 20: **Average Weekday Ridership Boarding Map**



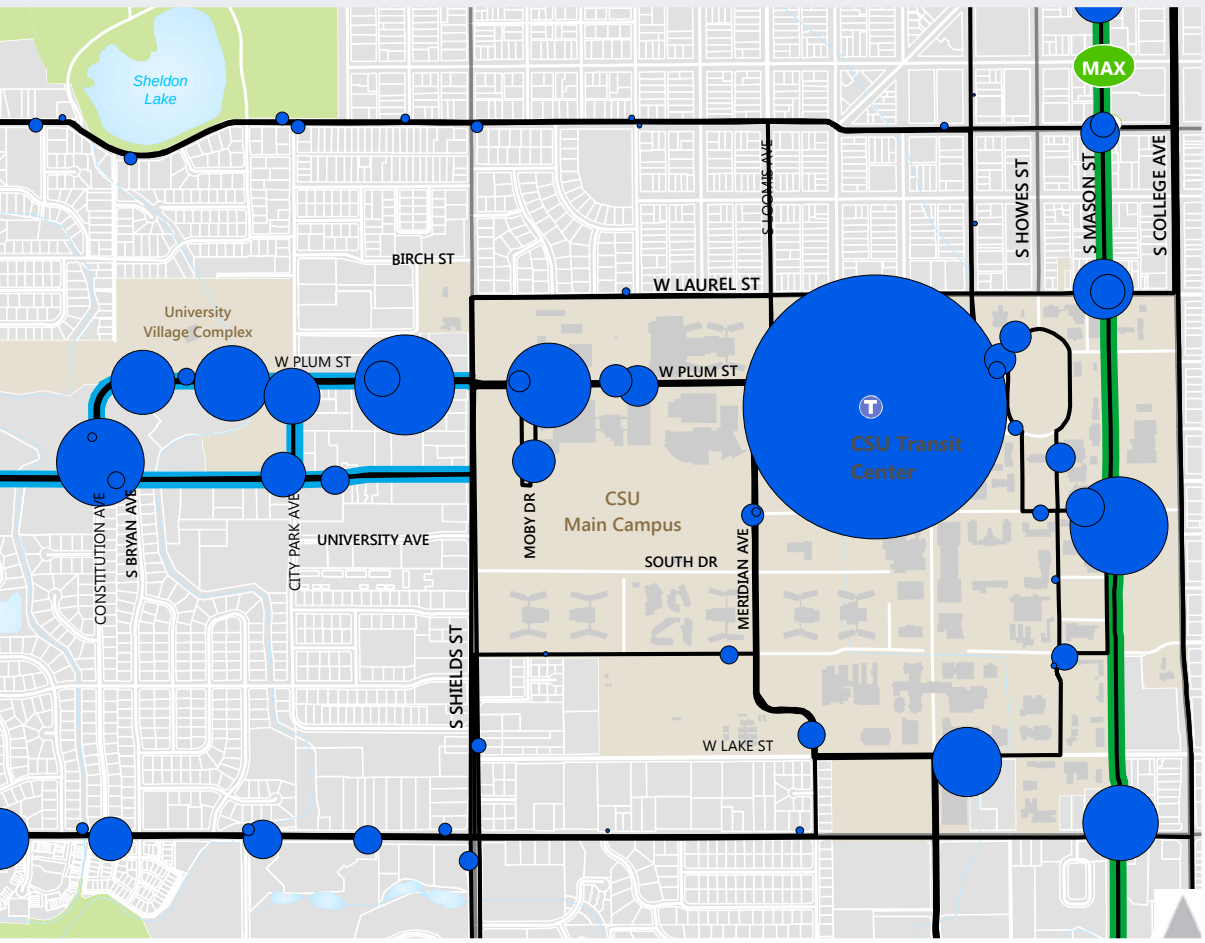

Sheldon Lake
BIRCH ST
University Village Complex
W PLUM ST
W PLUM ST
W LAUREL ST
S LOOMIS AVE
S HOWES ST
S MASON ST
S COLLEGE AVE
MAX
CSU Transit Center
CSU Main Campus
MOBY DR
SOUTH DR
MERIDIAN AVE
CONSTITUTION AVE
S BRYAN AVE
CITY PARK AVE
UNIVERSITY AVE
S SHIELDS ST
W LAKE ST

Figure 20 shows how the average weekday ridership is distributed at the stop level. The map shows how ridership is concentrated across key corridors and centers. The largest center is CSU, which is by far the dominant hub in the study area with over 20 percent of the boardings. West Elizabeth Street, Plum Street, and the MAX corridor are the corridors with the highest ridership. **Table 6,** which shows the top five stops in the study area, also reinforces the importance of key locations to the overall network ridership.

TABLE 6: Top Five Stops

Stop	Average Daily Boardings
CSU Transit Center	1,795
Plum Street at Bluebell Street	257
MAX University Station	247
West Elizabeth Street at King Soopers	220
Constitution Avenue at West Elizabeth Street	200

Ridership by Time of Day

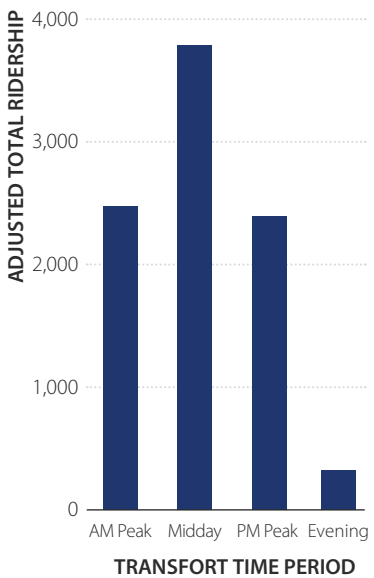
Evaluating ridership by time of day offers additional information on usage patterns that can help with resource investment and system optimization. Transfort uses the following definitions for its time periods:

AM Peak:	6:00 AM – 10:00 AM
Midday:	10:00 AM – 3:00 PM
PM Peak:	3:00 PM – 7:00 PM
PM (Evening):	7:00 PM – 11:00 PM
Late Night:	11:00 PM – 3:00 AM

The ridership distribution by time period does not deviate from expectations given that frequencies are fairly consistent throughout most of the day. In many systems that provide lifestyle mobility rather than just work and school commute travel, the midday ridership will equal the sum of AM and PM Peak time periods. Transfort follows this positive pattern once the wider peak periods are taken into account. The low ridership during the PM reflects the significant drop in evening service levels after the PM Peak Period in response to lower levels of general travel activity.

Figure 21 shows weekday ridership by time period for the corridor routes.[9]

FIGURE 21: Weekday Ridership by Time Period (West Elizabeth Study Area)



[9] *Note that none of the routes evaluated have late night service. Data is from January to April 2015.*

Ridership by Route

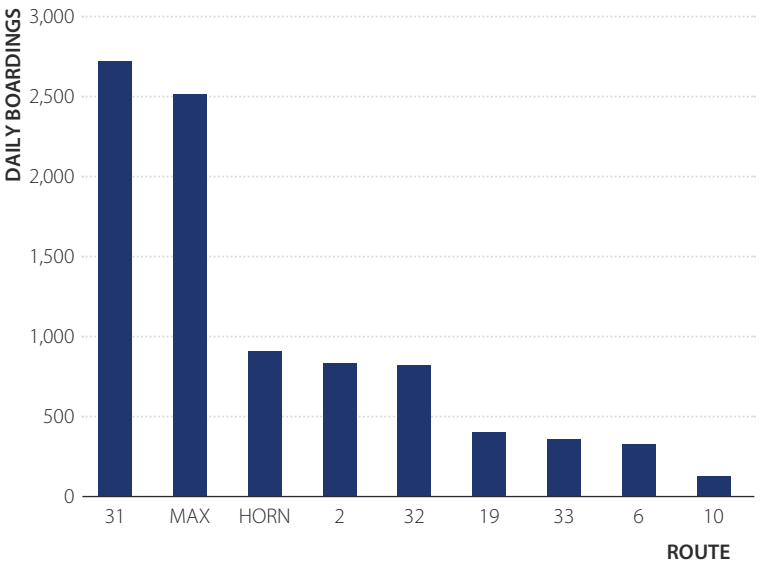
In addition to ridership being concentrated across key corridors and centers, ridership is also concentrated at the route level. **Figure 22** shows average weekday boardings by route.

Routes 31 and MAX account for nearly 60 percent of the average weekday boardings at all stops for routes in the study area. Passengers have responded positively to these frequent, linear routes. These services provide key connections to major destinations and hubs such as the CSU Transit Center, downtown Fort Collins, and the South Transit Center.

HORN is also a frequent service providing campus circulation every 10 minutes. This service is a new service that was implemented in August 2014. While it is the third most popular route, it carries less than the riders of Route 31, perhaps as a result of CSU being very walkable and making circulation by transit less necessary, especially when it is operating around the periphery of campus. Ridership will likely increase after the August 2015 service change when the HORN is extended south to serve the CSU Veterinary School and periphery campus parking lots. This change will result in the elimination of Route 34 and will improve operational efficiencies.

Routes 6 and 10 have the lowest ridership at all stops combined for routes in the study area. They serve lower density corridors, have less direct alignments, and operate at lower frequencies.

FIGURE 22: Average Weekday Boardings by Route



Ridership Composition

Within the study area 85% of all boardings were completed by riders with CSU fare media such as RamCards.[10] This illustrates the large impact that CSU has on the study area and the level to which ridership is associated with commute patterns of members of the university community.

CSU customers are especially concentrated on Routes 31, 32, 33, and 2 as these routes directly connect student housing communities to CSU facilities, as shown in **Figure 24.**

FIGURE 23: Method of Fare Payment

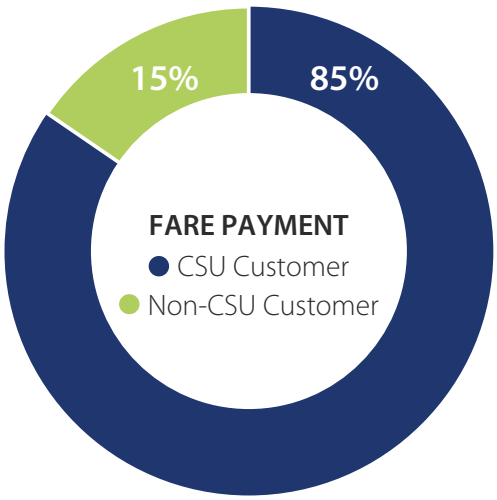
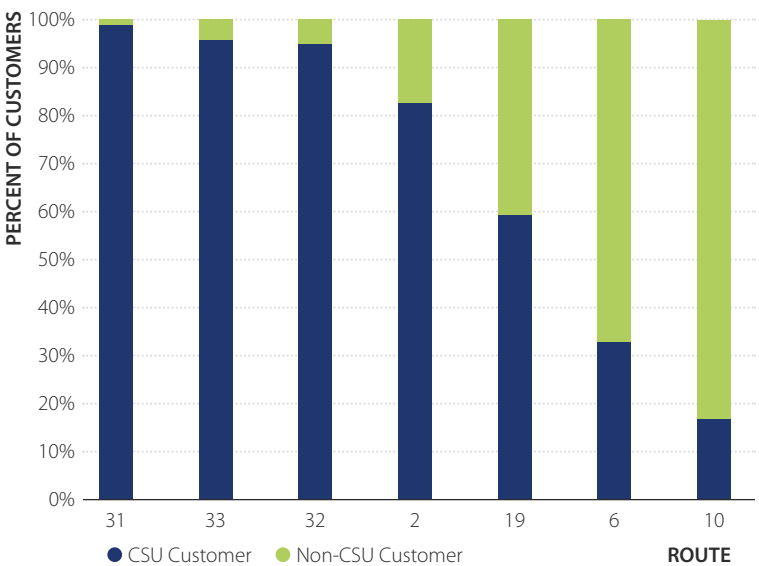


FIGURE 24: Method of Fare Payment by Route



[10] Based on farebox data from January 2015-March 2015. The majority of this time period CSU was in session. Ridership composition is likely different while CSU is out of session. Farebox data available for Routes 2, 6, 10, 19, 31, 32, and 33.

Passengers per Revenue Hour (Productivity or Service Effectiveness)

Productivity by Time Period

The routes in the study area had an average productivity of 37 passengers per revenue hour. This is a high level of productivity that satisfies Transfort's standards for most service types. When broken down by time period, midday service is the most productive period. This is a strong indication that transit is providing lifestyle mobility in the West Elizabeth Street study area, not surprising for a university community. **Figure 25** shows weekday passengers per revenue hour by time period.

FIGURE 25: Weekday Passengers per Revenue Hour by Time Period

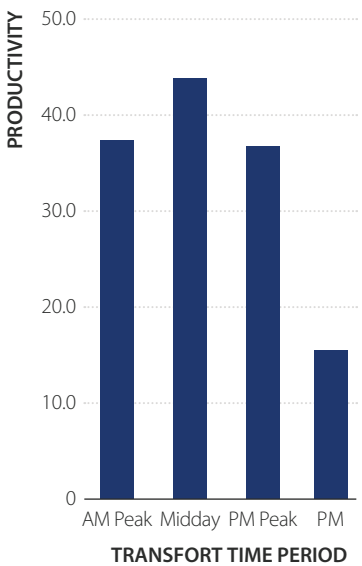


TABLE 7: Transfort Productivity by Route Performance Standards

Classification	Rapid Route *(boardings/ revenue hour)*	University Route *(boardings/ revenue hour)*	Residential Route *(boardings/ revenue hour)*
Exceeds	>50	>60	>40
Satisfactory	41 - 50	30 - 60	20 - 40
Marginal	20 - 40	20 - 30	15 - 20
Unsatisfactory	<20	<20	<15

Productivity by Route

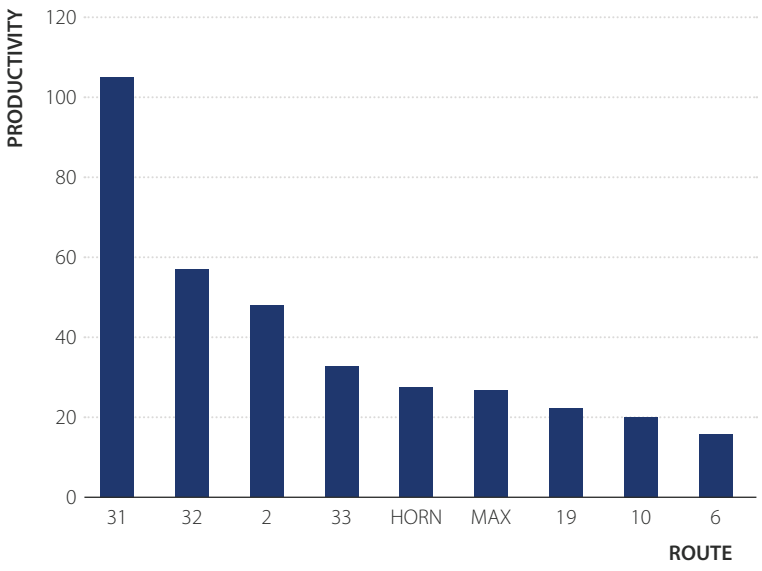
Evaluating productivity by route provides an opportunity to identify potential mismatches between market demand and transit supply. Transfort has established performance standards for routes based on service type; these performance standards are shown in **Table 7.** The agency recognizes that different routes should have different expectations based on their role. University-based services have higher thresholds given their larger potential market. **Figure 26** shows weekday passengers per revenue hour by route.

Routes 31, 32, and 33 are able to generate more than the minimum 30 passengers per revenue hour for university routes. In fact, Route 31 greatly exceeds the top university route standard by over 2½ times, generating more than 100 passengers per revenue hour. Transfort has developed a well-designed, highly effective route that presents some lessons learned for the rest of the study area: frequent, direct alignment that is easy to understand and use generates ridership. The four most productive routes in the study area all operate in the West Elizabeth Street Corridor (Routes 2, 31, 32, and 33) with direct alignments.

Both MAX and the HORN are frequent, but generate marginal productivity. The HORN provides peripheral transit circulation around a very walkable campus – especially one that has a coffee shop between the main Transit Center and classes. The HORN is fairly circuitous[11] and takes three buses to operate. MAX is similar to the HORN in that it operates frequently, also with a marginal productivity. As the key spine route, MAX is not fully leveraging the network due to a lack of direct connections with other high productivity[12] routes, most notably in the West Elizabeth Street Corridor.

The other three routes in the study area (Routes 19, 10, and 6) have the lowest productivity rates. Productivity can be improved by generating additional ridership or reducing resource requirements. The transit recommendations to be developed in this ETC Plan for the West Elizabeth Corridor will explore opportunities for these services via streamlined alignments and scheduling design efficiencies.

FIGURE 26: Weekday Passengers per Revenue Hour by Route



[11] The HORN has the frequency to capture spontaneous use riders, but not the alignment (peripheral) or fast travel (it is circuitous) necessary to achieve productivity goals.

[12] Productivity metrics based on boardings per revenue hour can be misleading for Rapid/BRT service given their longer average passenger trip lengths. A better comparison is Passenger Miles per Revenue Hour or Mile as it levels the productivity "playing field" between high turnover routes (e.g., Route 31) and lower turnover routes (e.g., MAX).

Passengers per Revenue Mile

Transfort also monitors passengers per revenue mile, another way of normalizing ridership over a unit of service. This metric tracks with productivity per hour except where there are differences in operating speed (i.e., operate fewer miles per hour). **Table 8** shows Transfort's standards for passengers per revenue mile.

TABLE 8: Transfort Passenger per Revenue Mile Standards

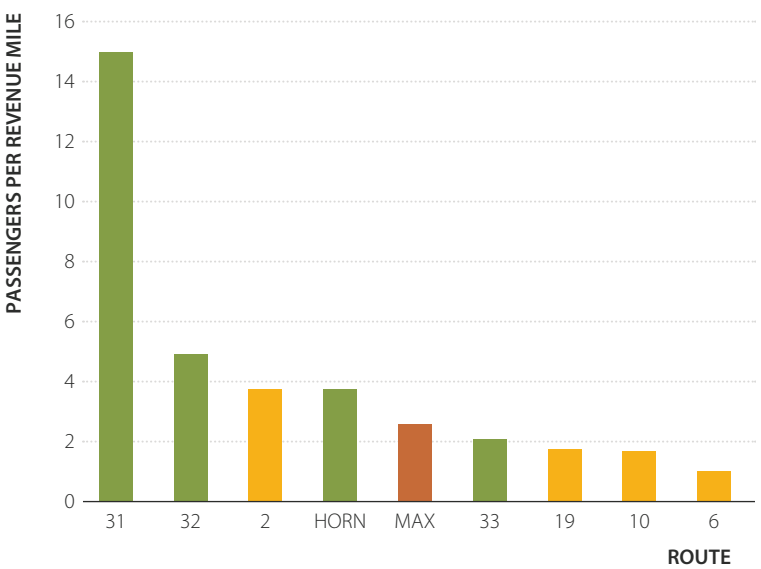
Classification	Rapid Route	University Route	Residential Route	Commercial Route
Exceeds	>8	>5	>2	>3.5
Satisfactory	6 - 8	3 - 5	1.5 - 2	2.5-3.5
Marginal	4 - 5	1.5 - 3	1 - 1.5	1.5-2.5
Unsatisfactory	<4	<1.5	<.5	<1.5

Once again, Route 31 is the top performer. Its high ridership volumes and short alignment allow it to perform well in this metric, reinforcing Route 31's role as a walk extender. Routes 2 and 32 are the other services on the study corridor that meet Transfort's passengers per revenue mile standards. However, Route 33 is in the 'marginal' category. It is one of the longer routes on the corridor, but passenger activity begins to drop at Ram's Pointe and King Soopers.

MAX does not generate high passengers per revenue mile. It has a longer alignment that serves a significant portion of Fort Collins. Rapid services are designed to accommodate longer trips and this type of service should be expected to have lower passengers per revenue mile.

Figure 27 shows weekday passengers by revenue mile.

FIGURE 27: Weekday Passengers per Revenue Mile by Route



Scheduling Efficiencies

Analyzing schedule recovery time and in-service time provides insight into opportunities for potential improvements to scheduling efficiencies. High recovery percentages increase unproductive resource requirements because more vehicles will be needed to provide a certain level of service. Service recovery efficiency is optimized during both route design and service scheduling based on cycle time divided by frequency. The less frequent the service, the greater the efficiency challenge at the scheduling phase.[13] However, even infrequent transit service can be designed to be efficient if the route alignment, running times, and frequencies are synchronized.

Typical industry efficiency targets for recovery time of 10-15 percent are sufficient to ensure next trip on-time departures while providing operator layover. Scheduled recovery for Transfort in the study area averages 27 percent, twice the target. When taking into account actual running time compared to scheduled running time, all routes in the study area complete trips in less time on average than what is scheduled.

TABLE 9: Weekday Recovery Efficiency

Route	Scheduled Revenue Hours	Scheduled Recovery	Scheduled Recovery %
2	17.5	3.5	25.1%
6	20.8	2.7	14.7%
10	6.4	1.4	28.1%
19	18.1	4.8	36.5%
31	25.9	6.9	36.5%
32	14.5	3.6	33.2%
33	10.9	1.4	14.3%
HORN	33.0	12.0	57.0%
MAX	94.4	15.2	19.3%
Total	**241**	**52**	27.1%

Route	Running Time		Difference
	Scheduled	Actual	
2	13.8	12.5	1.2
6	17.6	16.6	1.0
10	4.9	4.2	0.7
19	12.9	11.2	1.6
31	18.8	13.8	5.1
32	10.7	10.1	0.6
33	9.3	9.3	0.1
HORN	21.0	16.3	4.7
MAX	78.3	63.0	15.3
Total	**187.3**	**157.0**	**30.4**

[13] Any running time number (in-service time) divided by a large frequency number (e.g., 60 minutes) is more likely to leave a larger remainder (the recovery time). Frequent services (i.e., 15 minutes or less) can be scheduled efficiently regardless of route design (smaller denominator, less residual). While the normal "efficient" transit target is 10-15 percent recovery to ensure that the next trip leaves on-time, it is often impossible to achieve at the scheduling phase if an infrequent route has not been designed from the start to use resources efficiently.

The highest layover ratios occur on routes with some of the shortest alignments: 31, 32, and HORN. Synchronizing route alignments, in-service running time, and frequencies should be a key objective of the West Elizabeth Enhanced Travel Corridor Plan. Where efficient individual route cycles are not feasible, the interlining of individual routes where they share recovery time should be considered. When taking into account actual running time versus scheduled running time, each route within the study area takes less time to complete trips. When analyzing trends at a segment level, many routes are running just a few minutes behind or a few minutes ahead with the notable exception of the last segment in a trip pattern. For most routes, excessive scheduled running time is allocated between the second to last and last time point of a trip.

Segment Running Time Analysis

On-Time Performance

Transfort service standards define on-time trips as those trips that serve a time-point stop within 0 to 5 minutes of the published public schedule. Using this standard, 85% of trips in the West Elizabeth Corridor study area are on-time, 14% are late, and 1% of trips are early. Within the study area, on-time performance ranges from a high of 98% for the HORN and Route 31 to a low of 72% for Route 2. Route 31 and the HORN are relatively short routes with fewer time-points which helps keep them on-time. Route 2 on the other hand travels longer distances on major streets without signal priority which makes it more difficult to stay on schedule. Regardless of the route characteristic, reliability is a critical component in attracting new riders and more importantly, keeping transit existing riders. The below chart outlines the on-time performance of the nine routes in the West Elizabeth Corridor study area.

FIGURE 28: On-Time Performance

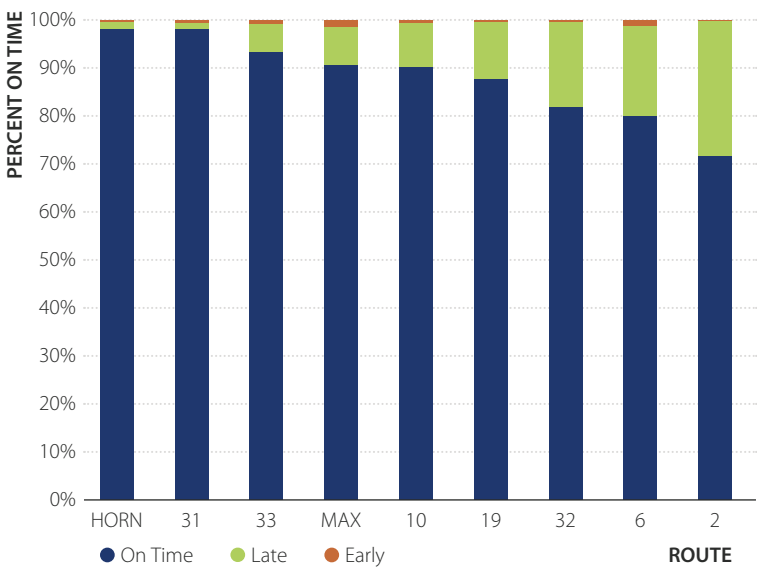


FIGURE 29: Passenger Leave Behinds by Time Period

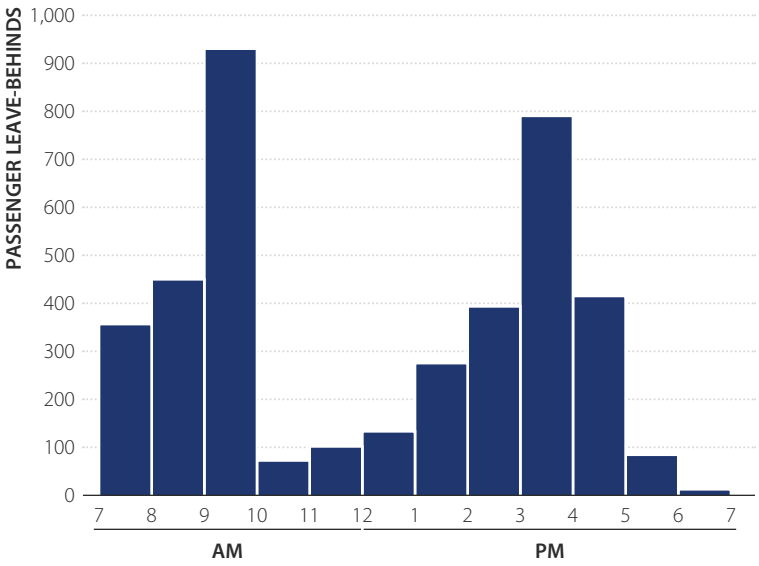
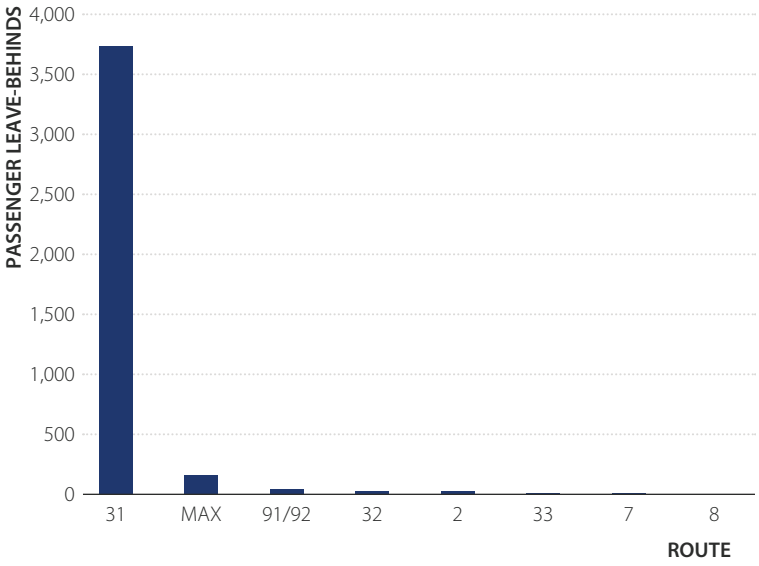


FIGURE 30: Passenger Leave Behinds by Route



Passenger Leave Behinds

Transfort currently deals with significant passenger leave behind issues. Particularly on Route 31 and during the AM Peak and PM Peak many students are not able to fit on board the bus. The problem is concentrated[14] along Plum Street just west of the CSU Main Campus in the mornings and at the Colorado Transit Center (CTC) during the afternoon. In an attempt order to address this issue, Transfort has supplemented Route 31 with additional trailer buses that are not part of the schedule during the most impacted time periods. As the West Campus area continues to develop and more student oriented housing is built in this area, the potential for overcrowding and passenger leave behinds will increase without additional vehicle capacity and frequencies.

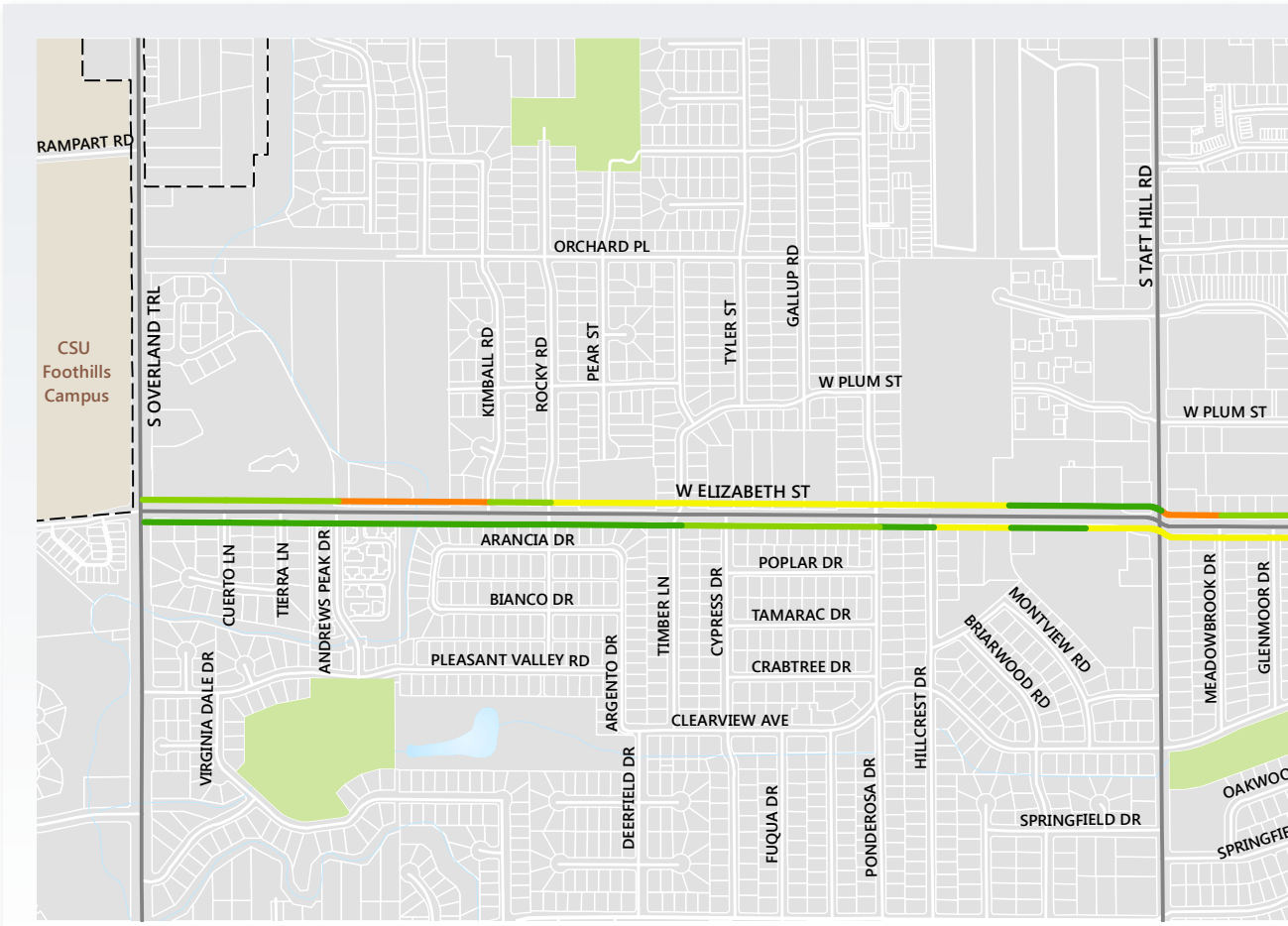
[14] Passenger leave behind data covers January to April 2015.

TRANSIT LEVEL OF SERVICE

A transit level of service assessment was performed which accounts for key transit route quality factors, as well as built environment attributes that affect a passenger's experience. Specifically the methodology accounts for reliability (whether there is dedicated transit right-of-way, whether mixed-flow level of service is acceptable, or whether mixed-flow level of service is unacceptable), first-mile and last-mile pedestrian and bicyclist infrastructure, bus operational amenities (bus bulb-outs or transit signal priority), and bus stop amenities.

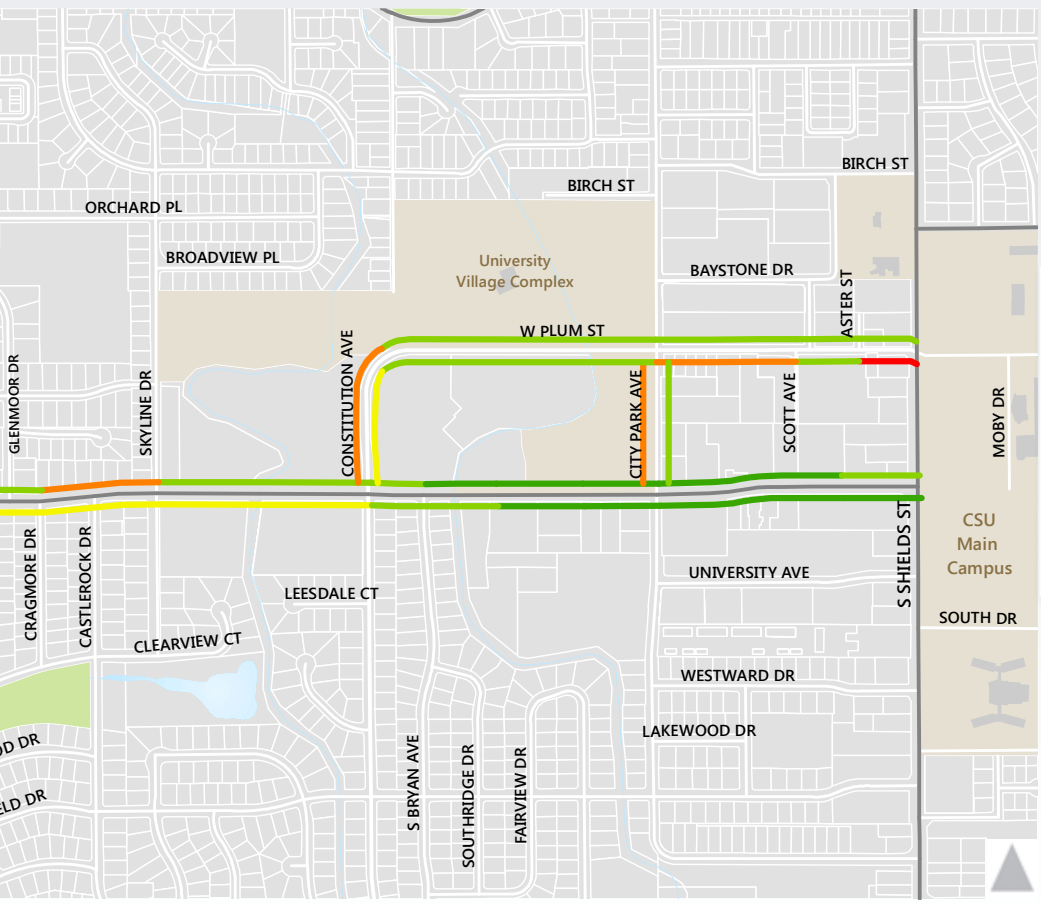
Figure 31 shows transit level of service in the study area according to this methodology. Because buses operate in mixed-flow lanes, and there are no bus bulb-outs or transit signal priority,

FIGURE 31: Transit Level of Service



the results of this analysis are heavily influenced by first-mile and last-mile pedestrian and bicyclist infrastructure and bus stop amenities. Study segments with a poor pedestrian level of service, as discussed later in this report, frequently have lower transit level of service as well.

The bus stops in the study area have very few patron amenities and are often not accessible using the pedestrian and bicycle networks. Providing pedestrian and bicycle access to transit stops is an important component of making riding transit safer, more accessible and comfortable. The study area does not provide complete and ADA accessible sidewalks, and bus stop loading and unloading areas and stops are not always located near signalized and enhanced midblock marked crossings. Bike lanes are also inconsistent with a lack of end of trip bike facilities such as bike parking.



KEY FINDINGS AND ISSUES

Transit service performance is highly influenced by matching market opportunities with a good network and route design. The following section lists key findings and issues that should be considered when moving forward with the corridor vision and alternatives development.

Opportunity to Simplify Study Corridor

The West Elizabeth Street Corridor is a productive segment of the Transfort network. However, study area transit is quite complex and confusing for customers to easily use as a network. For example, on the West Elizabeth Street there are four routes that serve this corridor, each with a different frequency, alignment, and schedule. Although these routes provide a combined total of 14 one-way trips between 8 to 9 AM, service effectiveness is diminished because customers must learn how each of these routes operate. This layer of complexity creates a barrier to transit route and network use that needs to be reevaluated in the development of the proposed mobility plan.

Infrastructure

Improvements need to be made to infrastructure within the corridor in order to optimize route performance and service delivery. These improvements include but are not limited to: intersection redesign, signal prioritization, bus stop infrastructure, accessibility of transit, and direct connectivity through the CSU Main Campus to MAX service.

Corridor Roles

West Elizabeth Street and Plum Street are in close proximity to one another. These streets are separated by a ¼ mile, 3-minute walk, yet both of these corridors are served by multiple routes. Industry best practices suggest that this type of complex corridor duplication should be consolidated to maximize efficient and effective delivery of frequent transit. While the operating environment surrounding West Elizabeth Street and CSU is unique, the idea of corridor roles and priorities should still be discussed.

Continue to Match Frequency and Span with Demand

Transfort has generally done a good job of recognizing varying market needs within the study area, operating routes at different frequencies depending on projected market demand. The exception to this practice has been inadequate level of service to meet the demand along Route 31 which is reflected in the large number of passenger leave behinds during peak periods while CSU is in session. The alternatives should assess other opportunities to increase frequencies in areas with higher demand, as well as scale back service levels in areas with lower demand. Transfort services typically end in the early evening. The alternatives should also consider expanding spans where it makes sense. This should be implemented on a route-by-route and trip-by-trip basis.

Leverage MAX Service
MAX is a key spine in the Fort Collins transit network. However, the only close connection between MAX and the CSU Transit Center is via the HORN (and only in the northbound HORN direction). Creating a better connection between the study corridor and MAX will improve the passenger experience and can potentially move this part of the network towards a grid. This connection could be via a separate route or a MAX branch alignment on the West Elizabeth Corridor.

Scheduling Efficiency
Transfort has a significant amount of schedule recovery that reduces service and operating efficiency. The development of alternatives should prioritize efficient route and network design such that efficient schedule cycles result.

KEY FINDINGS SUMMARY

The study area route network is complex and confusing to customers with four different routes serving the same general area with different alignments, configurations, and frequencies.

Infrastructure improvements ranging from bus stop amenities to intersection designs are required to enhance service delivery.

Significant numbers of passengers are left behind on Route 31 and to a lesser extent on MAX during peak AM and PM periods. Additional buses are scheduled at critical times but often fail to meet the demand for service.

For all Transfort routes that serve the study area, average weekday ridership was approximately 10,000 in February 2015 and 8,000 in March and April 2015.

Top ridership stops in the study area include the CSU Transit Center, stops along Plum Street and Constitution Avenue between Shields Street and West Elizabeth Street, and stops on West Elizabeth Street just west of Taft Hill Road.

Of routes in the study area, the routes with the highest frequencies and most direct routing have the highest ridership. Route 31 and MAX have the highest average weekday boardings.

PEDESTRIANS

This section analyzes the performance and comfort of the West Elizabeth Street study area for pedestrians. The findings from this analysis provide a framework for shaping recommendations for the corridor. This section identifies locations where it may be appropriate to improve pedestrian infrastructure. Key items include the locations of existing pedestrian infrastructure, pedestrian counts in the study area, peak hour pedestrian delay at study intersections, and pedestrian level of service on the corridor.

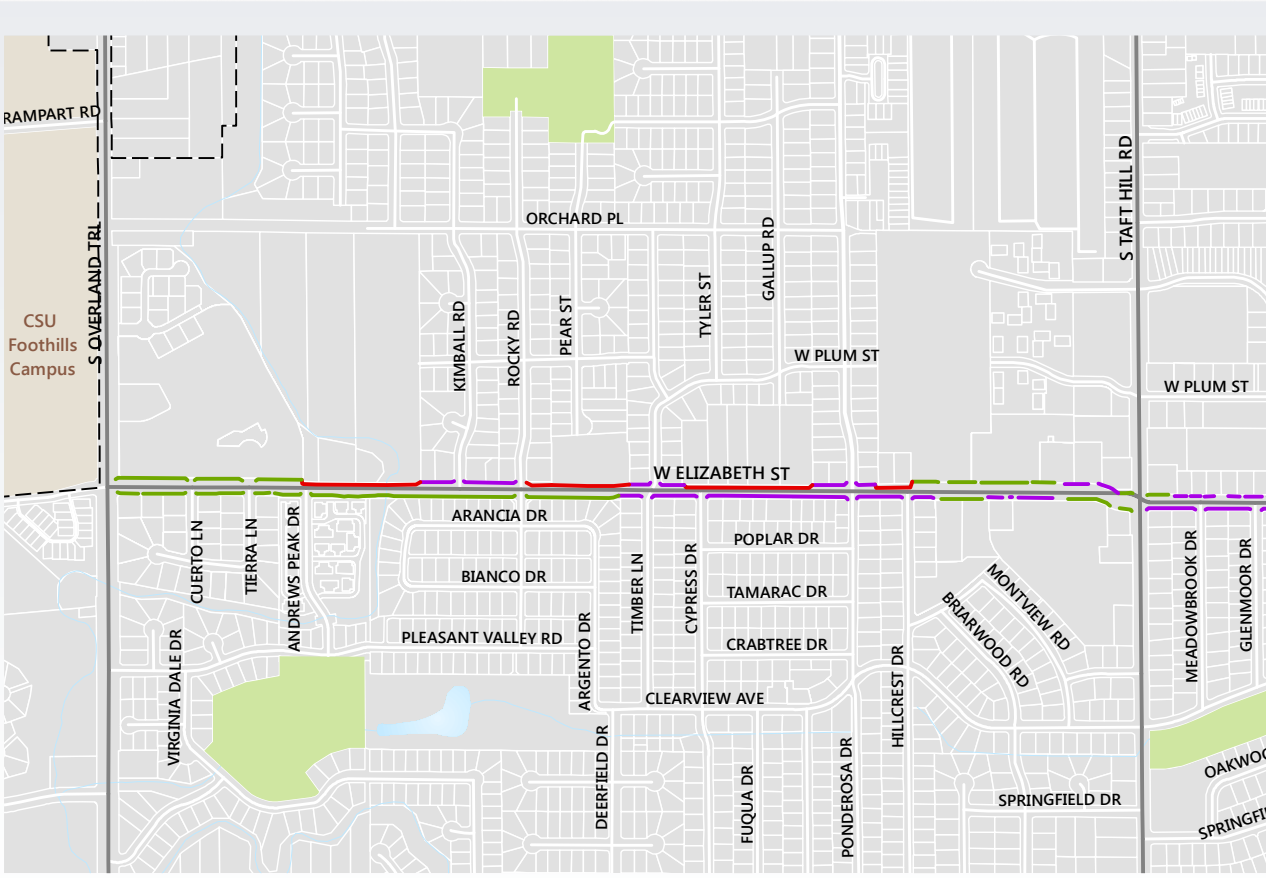
The presence of sidewalks and buffers (for detached sidewalk) along West Elizabeth Street varies, as shown in **Figure 32.** The sidewalk network is incomplete, with many sections that are missing or narrow and not ADA accessible. The sidewalk east of Taft Hill Road is a mix of attached and detached sidewalk, except for the short segment of sidewalk immediately west of Shields Street on the north side. This segment of sidewalk jogs through a parking lot, creating a high conflict area with turning vehicles. West of Taft Hill Road, there are large sections of missing sidewalk on the north side of West Elizabeth Street. Segments in the west part of the corridor with existing sidewalk are a mix of both attached and detached walk. Plum Street and City Park Avenue have almost all attached sidewalks, while Constitution Avenue has all detached sidewalks.

The sidewalks in the study area range in their condition. The sidewalks in front of newly developed properties, such as on Plum Street, are wide and in good condition. Many sidewalk segments in the study area, primarily in the western section of West Elizabeth Street, are in poor condition due to either width or pavement condition. Sidewalks are generally well maintained and with minimal obstructions. The majority of segments with sidewalks present have curb ramps. However, many sections of the study area, primarily west of Taft Hill Road, have segments of sidewalk below the ADA standard width of four feet, with some sections as narrow as three feet. In particular, some of the sections of narrow sidewalk over bridges and on ditches are in poor condition.

There are currently two midblock crossings in the study area in addition to crossings at signalized intersections—on West Elizabeth Street west of Shields Street and on West Elizabeth Street west of Skyline Drive. A third midblock crossing on West Elizabeth Street west of Taft Hill Road, west of the King Soopers driveway, is pending and will be implemented in Fall 2015.

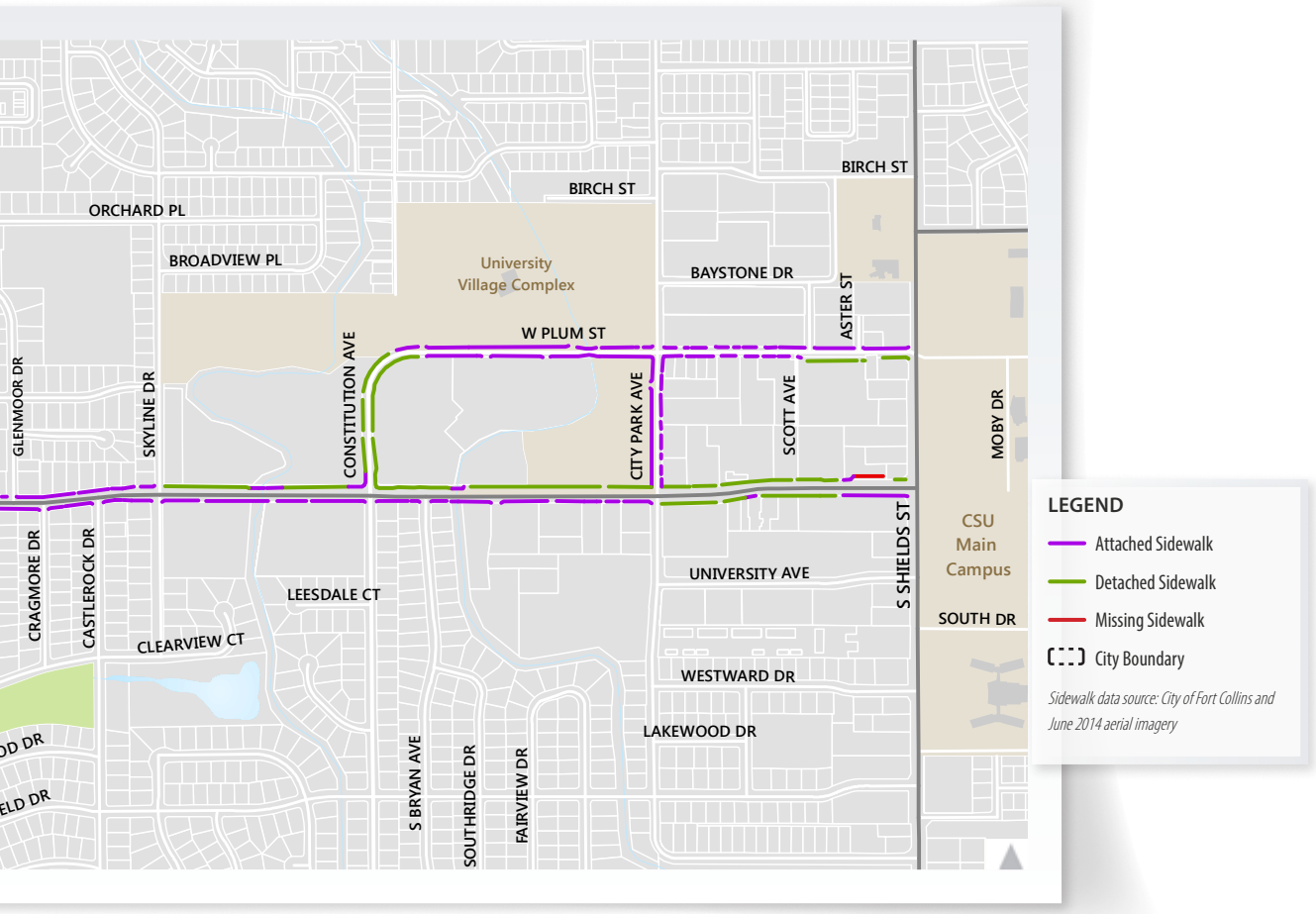
Pedestrian volumes at intersections and midblock in the AM and PM peak hours are shown in **Figure 33.** Counts were provided by the City of Fort Collins Traffic Operations. Pedestrian volumes are highest at the West Elizabeth Street/Shields Street intersection and the Plum Street/Shields Street intersection for pedestrians traveling east-west. High pedestrian volumes have also been observed just

FIGURE 32: Existing Sidewalk Network



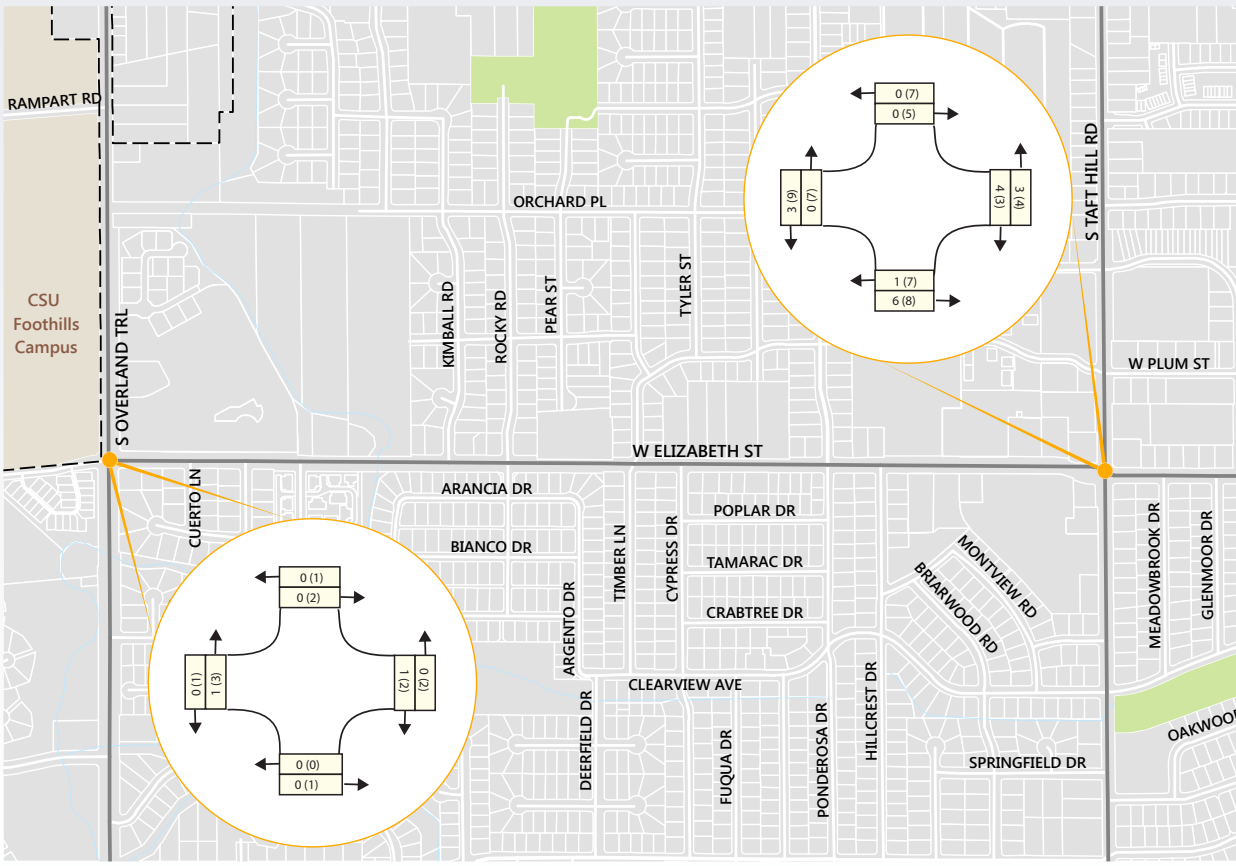
Note: Gaps in sidewalk infrastructure indicate street or driveway access and is not indicative of missing sidewalk infrastructure. Gaps indicating access points may not be comprehensive.

west of Taft Hill Road, in front of the King Soopers driveway, at the location of the pending third midblock crossing in the study area. Pedestrian volumes are low at the West Elizabeth Street/Constitution Avenue intersection and the West Elizabeth Street/Overland Trail intersection. The city analyzed midblock pedestrian volumes on West Elizabeth between City Park Avenue and Constitution Avenue as well as in front of King Soopers. This analysis revealed a sufficient demand for a midblock crossing in front of King Soopers but not between City Park Avenue and Constitution Avenue based on volumes at the time.



The pedestrian level of service was calculated for the study segments and is shown in **Figure 34.** This value represents the level of comfort of the pedestrian experience. This calculation considers the width of the sidewalk, width of the buffer, distance between crossings, and appropriate midblock crossing treatment if one were to be installed. The required crossing treatment is an indicator of the level of comfort associated with crossing the street. The pedestrian LOS is highest (most comfortable) on West Elizabeth Street in the Campus West area (west of Shields Street) and just east of Overland Trail, and on

FIGURE 33: Existing Pedestrian Volumes



Constitution Avenue and Plum Street between City Park Avenue and Shields Street. Pedestrian LOS is the lowest (least comfortable) on the north side of West Elizabeth Street between Hillcrest Drive and Andrews Peak Drive due to the missing sidewalk.

Average pedestrian delay at each signalized intersection was also calculated using Vissim. **Table 10** shows the average pedestrian delay and level of service at each signalized study intersection.

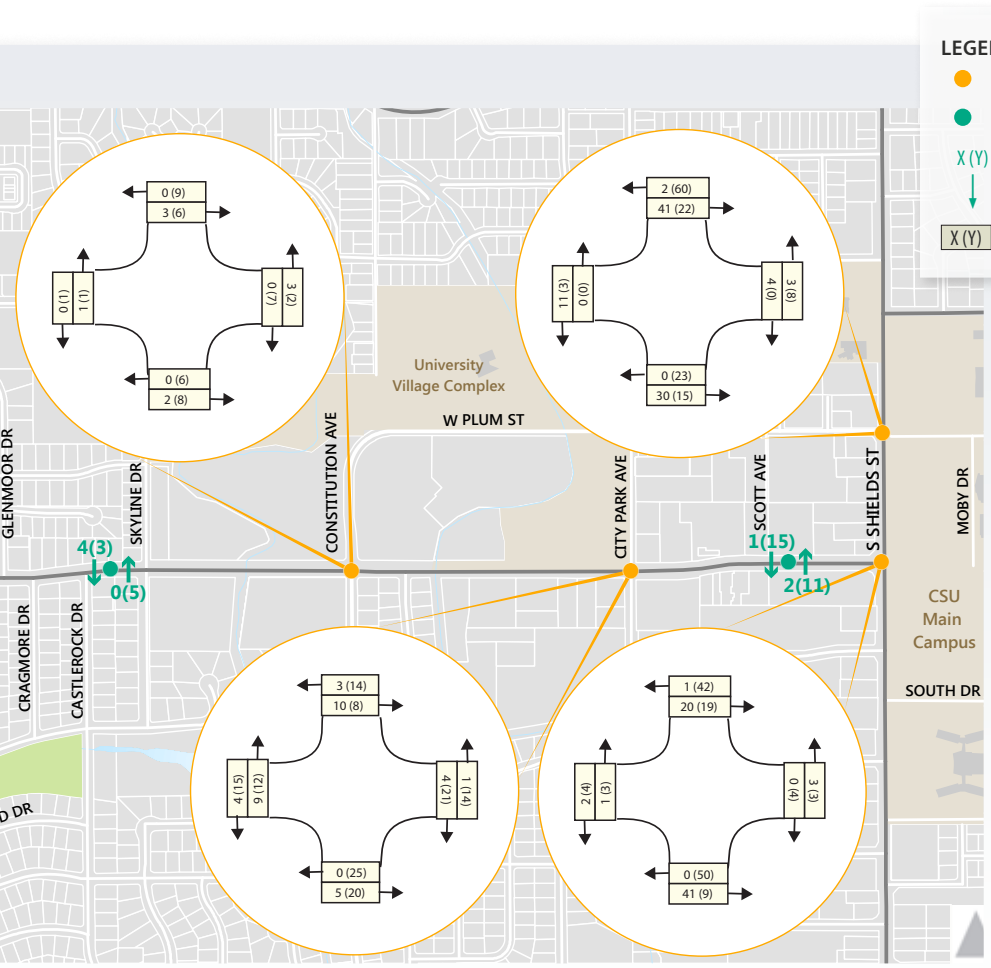


FIGURE 34: Pedestrian Level of Service

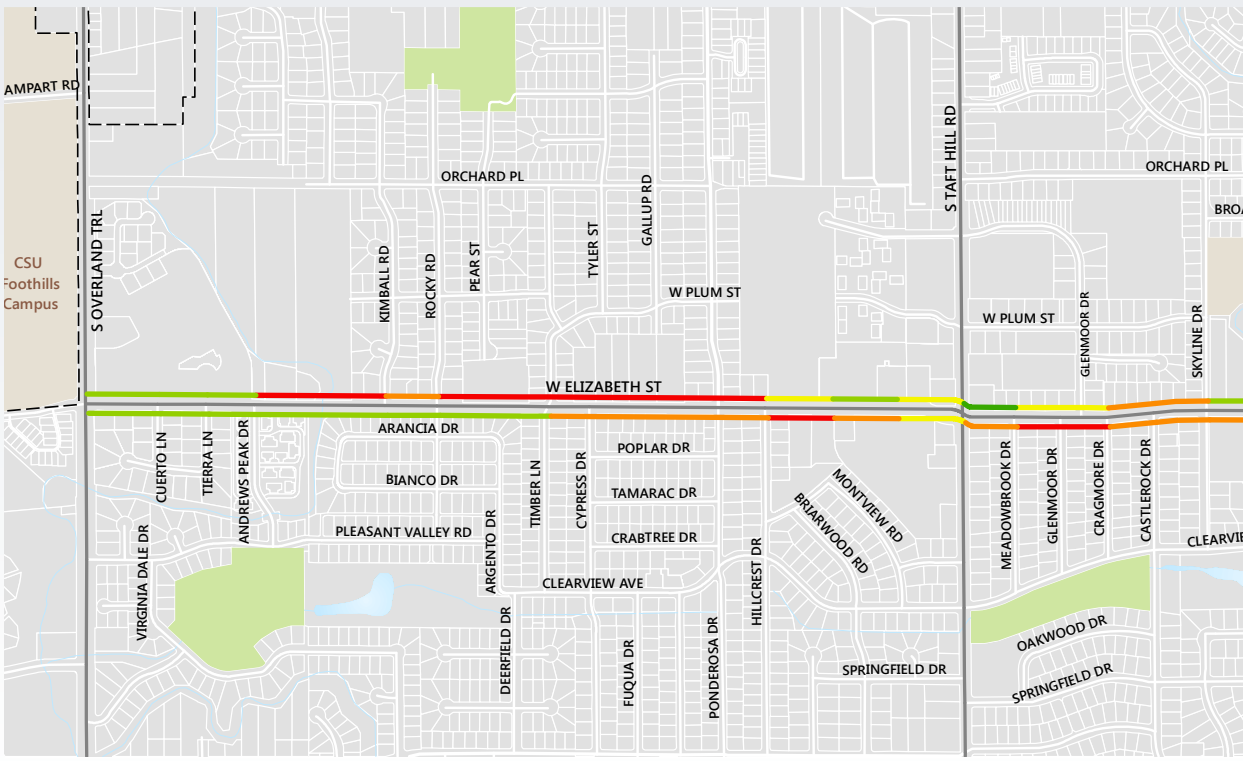


TABLE 10: Existing Pedestrian Delay and Level of Service

Intersection	Control	Existing Conditions			
		AM		PM	
		Delay *(seconds)*	LOS	Delay *(seconds)*	LOS
West Elizabeth Street/ Overland Trail	Side-Street Stop	N/A – side-street stop intersection			
West Elizabeth Street/Taft Hill Road	Signal	34	D	45	E
West Elizabeth Street/Constitution Avenue	Signal	16	B	21	C
West Elizabeth Street/City Park Avenue	Signal	20	B	29	C
West Elizabeth Street/Shields Street	Signal	53	E	57	E

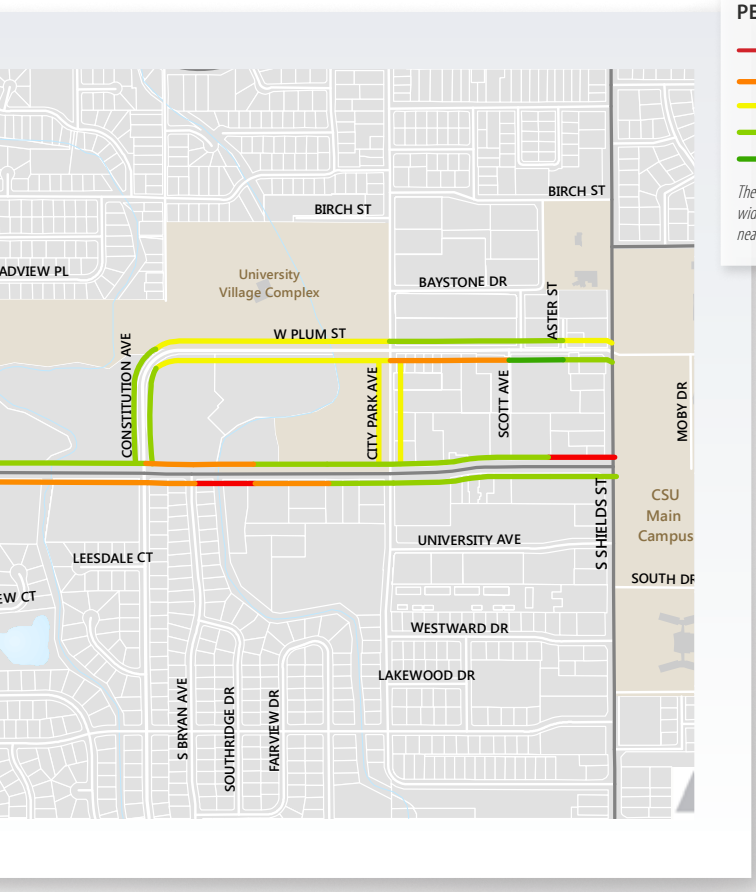


Table 10 shows that average pedestrian delay is relatively high at most study intersections during both the AM and PM peak hour, with the exception of the West Elizabeth Street/ Constitution Avenue and West Elizabeth Street/City Park Avenue intersections. When a pedestrian is forced to wait 30 seconds or longer, research has indicated that he/she becomes impatient and partakes in risk-taking behavior.

TABLE 10: Existing Pedestrian Delay and Level of Service

Intersection	Control	Existing Conditions			
		AM		PM	
		Delay *(seconds)*	LOS	Delay *(seconds)*	LOS
Shields Street/Plum Street	Signal	52	E	58	E
Shields Street/Laurel Street	Signal	46	E	61	F
Shields Street/Lake Street	Signal	49	E	53	E
Shields Street/Prospect Road	Signal	52	E	69	F

Note: The City of Fort Collins does not have a minimum acceptable delay-based pedestrian LOS.

KEY FINDINGS

Some sidewalks are attached, some are detached, and there are many locations where no sidewalk exists or sidewalk width is too narrow for people using mobility devices.

Significant lengths of West Elizabeth Street have a low pedestrian level of service, a measurement of the quality of the pedestrian environment that accounts for sidewalk presence and width as well as other amenities.

In addition to marked crossings at signalized intersections, there are two existing midblock crossings on the corridor, one west of Shields Street and another west of Skyline Drive, and one planned marked crossing, just west of King Soopers driveway.

Over 100 pedestrian crossings (all directions) occur during peak hours at four signalized intersections within the study area.

Pedestrian delay at some signalized intersections is relatively high (greater than 40 seconds) at most study intersections during peak hours.

BICYCLISTS

This section analyzes the performance and comfort of the West Elizabeth Street study area for bicyclists. The findings from this analysis provide a framework for shaping recommendations on the corridor. This section identifies locations where it may be appropriate to improve bicyclist infrastructure. Key themes include the locations of existing and proposed bicyclist infrastructure, peak hour bicyclist delay at study intersections, and bicyclist Level of Traffic Stress (LTS) on the corridor.

Figure 35 shows the number of bicyclists at intersections along West Elizabeth Street during AM and PM peak hours. The largest number of bicyclists is at the Plum Street/Shields Street intersection, traveling eastbound or westbound. The West Elizabeth Street/Shields Street intersection has only slightly fewer bicyclists traveling eastbound or westbound. Daily bicyclist volumes on West Elizabeth Street generally increase from west to east: west of Taft Hill Road and west of Skyline Drive there are approximately 700 to 800 bicyclists per day, and west of Shields Street there are approximately 2,040 bicyclists per day. At all intersections, the large majority of bicyclists cross the intersection in the roadway, with only a small number using the marked crosswalks. Counts were provided by the City of Fort Collins Traffic Operations.

It is important to consider existing bicycle facilities in the study area as well as facilities in the surrounding street network. West Elizabeth Street, Plum Street, Shields Street, and City Park Avenue and Constitution Avenue between Plum Street and West Elizabeth Street have existing bike lanes. A number of streets in the surrounding area have bike lanes, sharrows, or are designated bike routes. Existing bicycle facilities in the area can be seen in **Figure 36.**

Figure 37 shows facilities recommended in the 2014 Bicycle Master Plan (BMP) as part of a comprehensive, low-stress network to be implemented over the next 25 to 50 years. As shown in the figure, West Elizabeth Street from Shields Street to Overland Trail is designated as a protected bike lane. Shields Street within the study area is also

designated as a protected bike lane. Plum Street from Shields Street to West Elizabeth Street (including Constitution Avenue) is identified as a buffered bike lane. City Park Avenue is designated as a neighborhood greenway. The ETC Plan will build off the BMP recommendations to further evaluate appropriate types of facilities/design details that best serve the area.

Average bicyclist delay at each signalized intersection was also calculated using Vissim. **Table 11** shows the average bicyclist delay and level of service at each signalized study intersection.

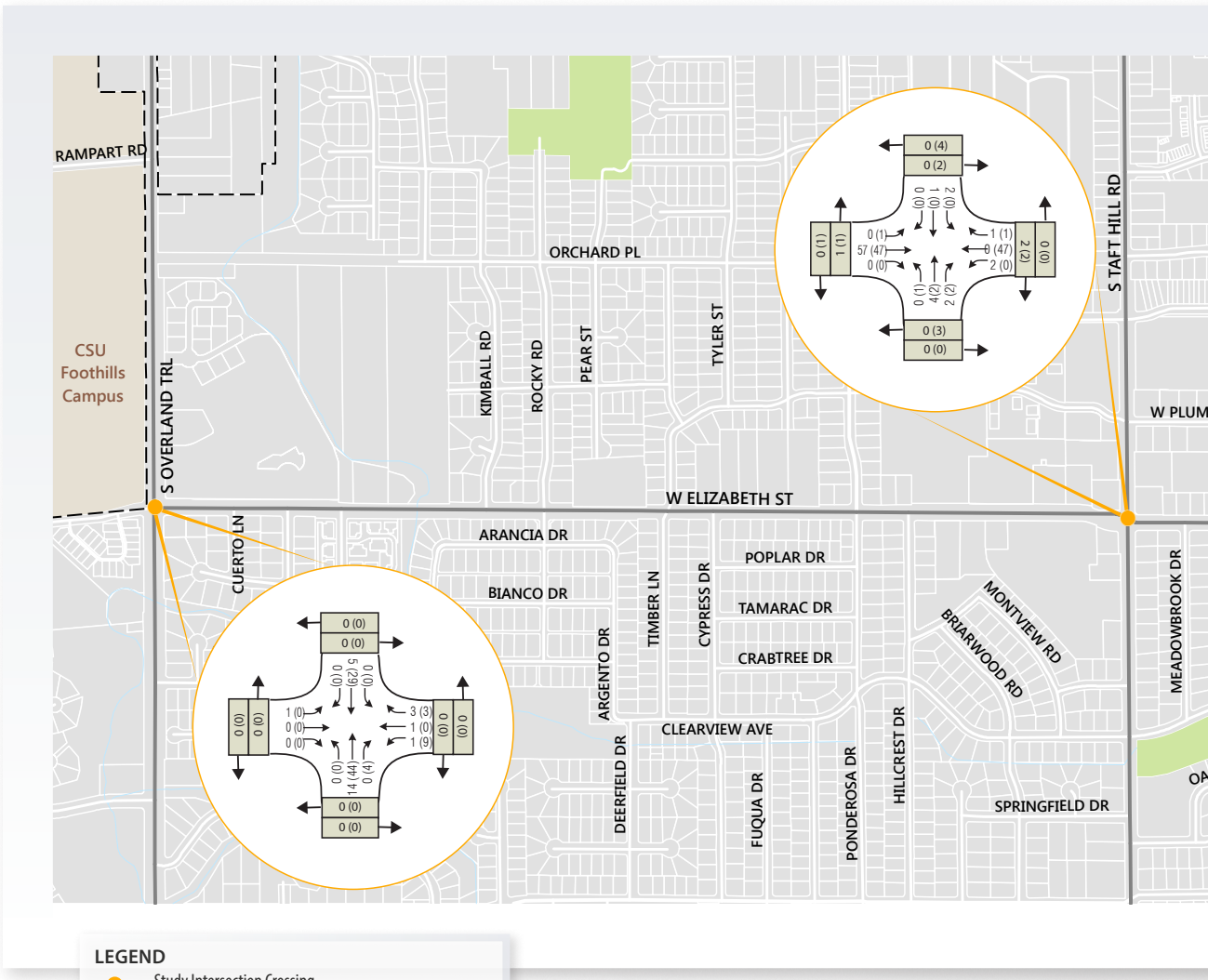
Table 11 shows that average bicyclist delay ranges from low ("A") to high ("E"). The lowest average bicyclist delays are observed at the West Elizabeth Street/Constitution Avenue, West Elizabeth Street/City Park Avenue, Shields Street/Laurel Street, and Shields Street/Lake Street intersections. Relatively high average bicyclist delays are observed at the Shields Street/Prospect Road intersection during the AM peak hour and the West Elizabeth Street/Shields Street and West Elizabeth Street/Plum Street intersections during the PM peak hour.

TABLE 11: Existing Bicyclist Delay and Level of Service

Intersection	Control	Existing Conditions			
		AM		PM	
		Delay	LOS	Delay	LOS
West Elizabeth Street/Overland Trail	Side-Street Stop	N/A – side-street stop intersection			
West Elizabeth Street/Taft Hill Road	Signal	31	D	36	D
West Elizabeth Street/Constitution Avenue	Signal	13	B	10	B
West Elizabeth Street/City Park Avenue	Signal	10	B	13	B
West Elizabeth Street/Shields Street	Signal	38	D	40	E
Shields Street/Plum Street	Signal	32	D	44	E
Shields Street/Laurel Street	Signal	12	B	18	B
Shields Street/Lake Street	Signal	5	A	18	B
Shields Street/Prospect Road	Signal	44	E	29	C

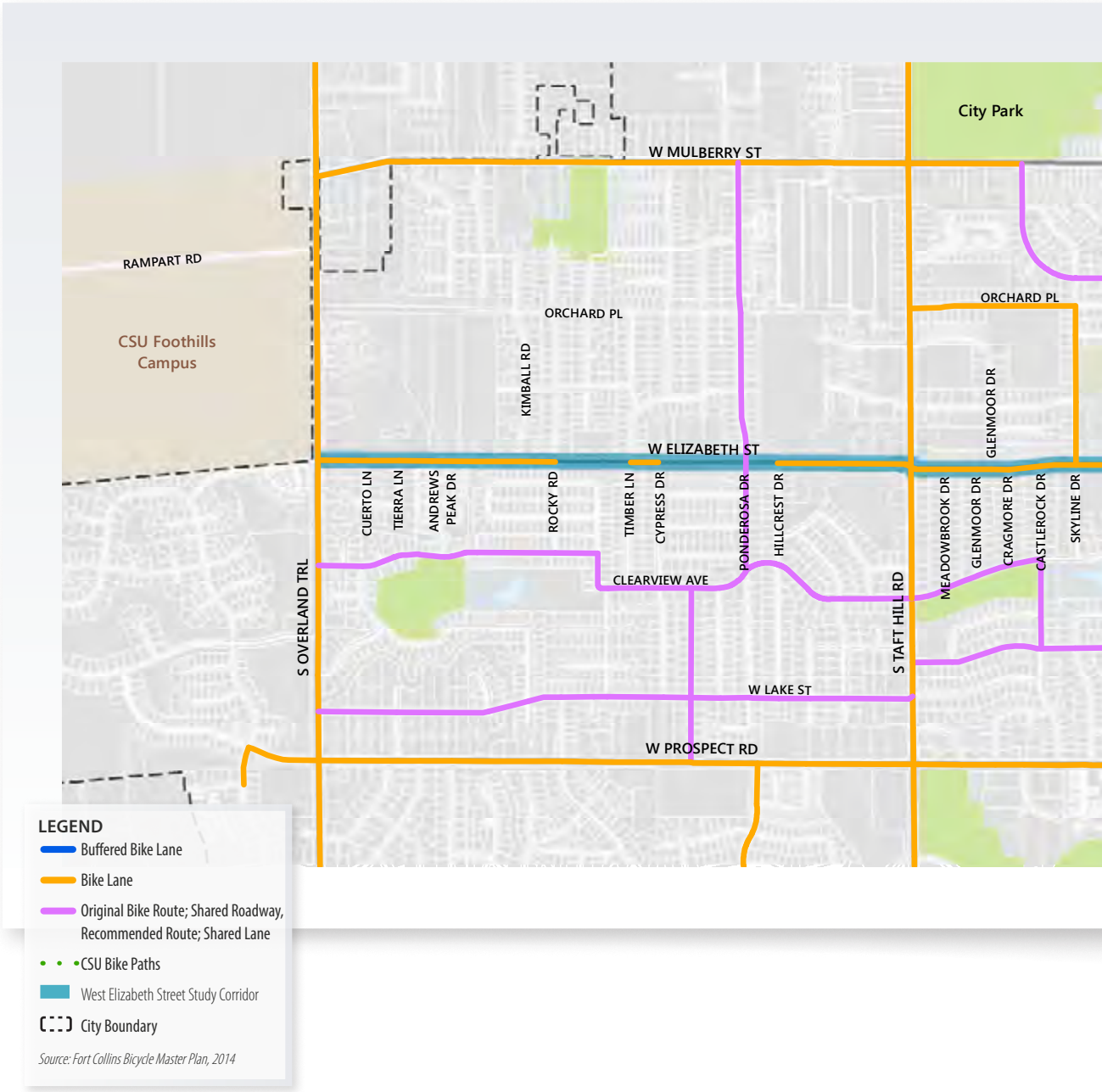
Note: the City of Fort Collins does not have a minimum acceptable delay-based bicyclist LOS.

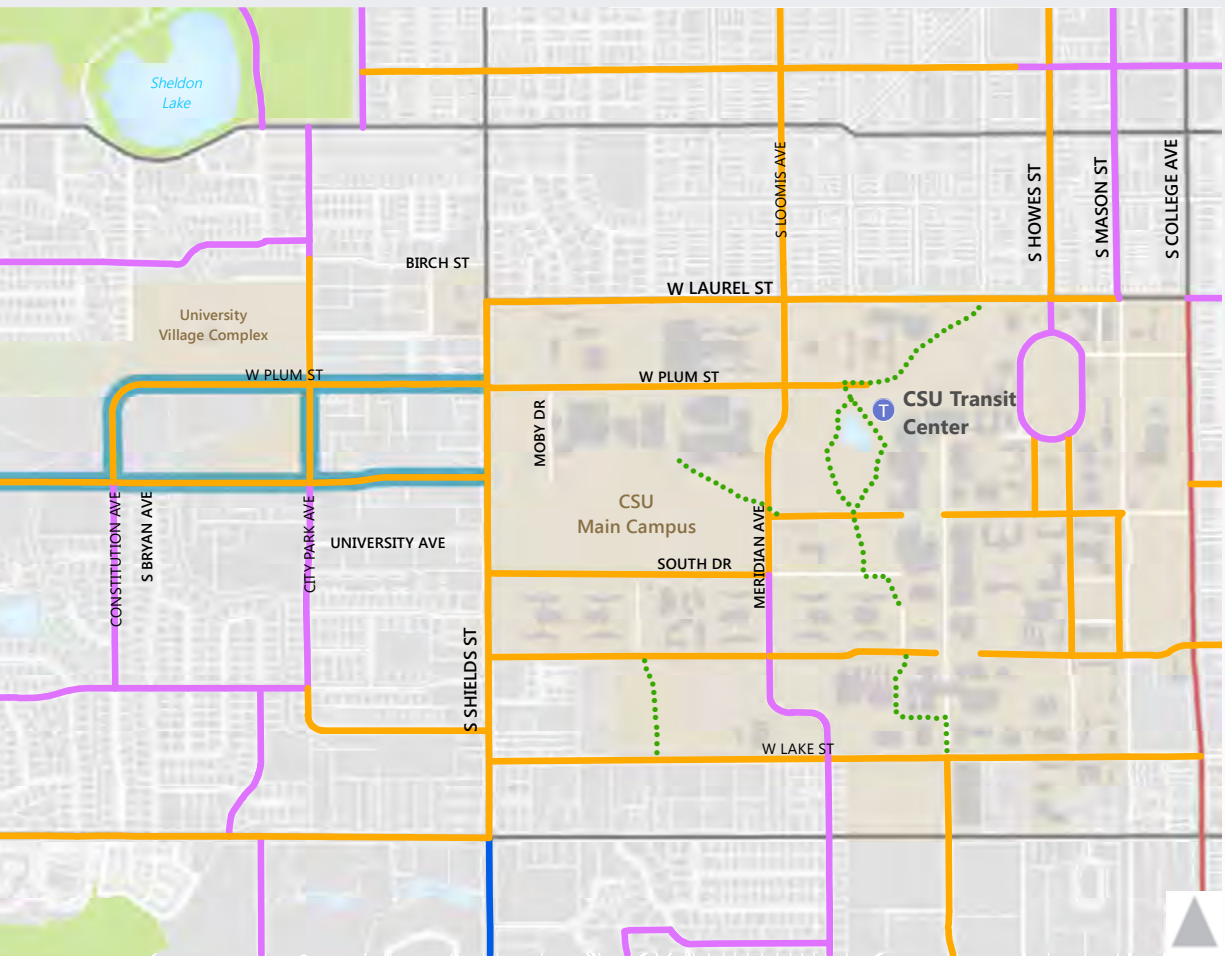
FIGURE 35: Existing Bicycle Volume



University Village Complex
W PLUM ST
CONSTITUTION AVE
SKYLINE DR
CITY PARK AVE
SCOTT AVE
S SHIELDS ST
MOBY DR
CSU Main Campus
SOUTH DR
GLENMOOR DR
CRAGMORE DR
CASTLEROCK DR
ST
KWOOD DR

FIGURE 36: Existing Bicycle Facilities

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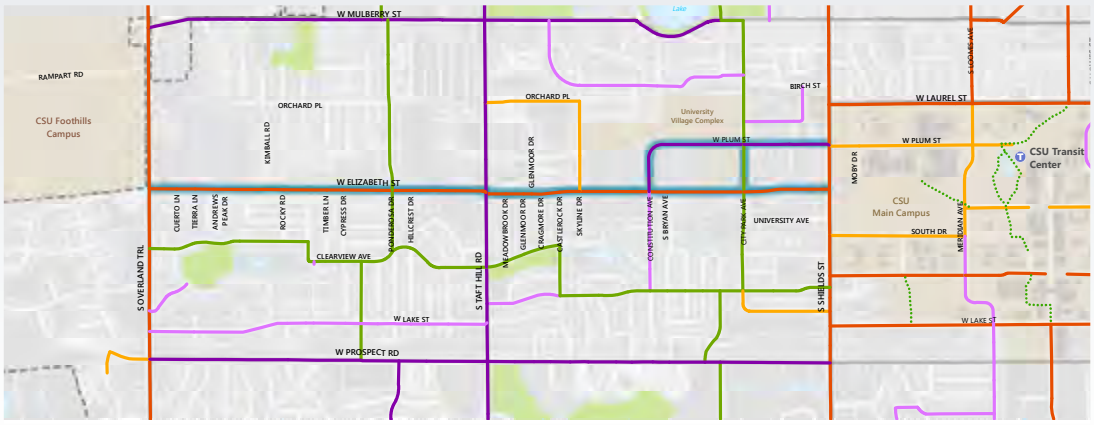
CSU Main Campus
SOUTH DR
MERIDIAN AVE
W LAUREL ST
S LOOMIS AVE
S HOWES ST
S MASON ST
S COLLEGE AVE
CSU Transit Center
W LAKE ST

FIGURE 37: Bicycle Facilities Full Build Plan



BICYCLE NETWORK FULL BUILD PLAN

- Buffered Bike Lane
- Bike Lane
- Neighborhood Greenway
- Protected Bike Lane
- Priority Shared Lane; Shared Roadway, Recommended Route; Bike Route; Signed Route
- CSU Bike Paths
- West Elizabeth Street Study Corridor
- City Boundary

Source: Fort Collins Bicycle Master Plan, 2014

The Bicycle Level of Traffic Stress (LTS) was calculated for the study area using the methodology outlined in the Fort Collins 2014 Bicycle Master Plan, as shown in **Figure 38.** This calculation considers speed on the roadway, average daily traffic, and the bicycle facility type. The LTS on the study segments, as shown in **Figure 39,** is lowest (most comfortable) along Plum Street, Constitution Avenue, and City Park Avenue. West Elizabeth Street has the lowest LTS at the half mile just east of Overland Trail due to the lower ADT and two travel lanes, compared to the higher stress conditions with four travel lanes further east on the corridor. There are a number of access points along the corridor, especially between City park Avenue and Shields Street, that creates additional conflict points for bicyclists.

FIGURE 38: Bicycle LTS Table (2014 Bicycle Master Plan)

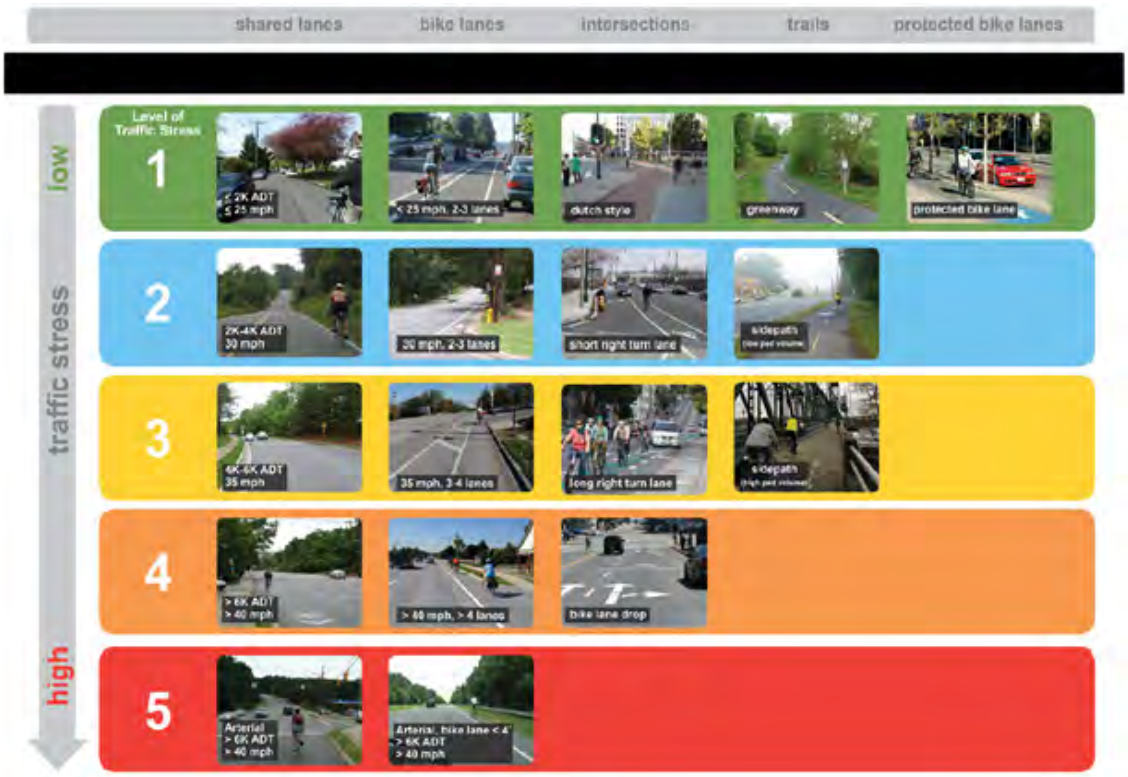
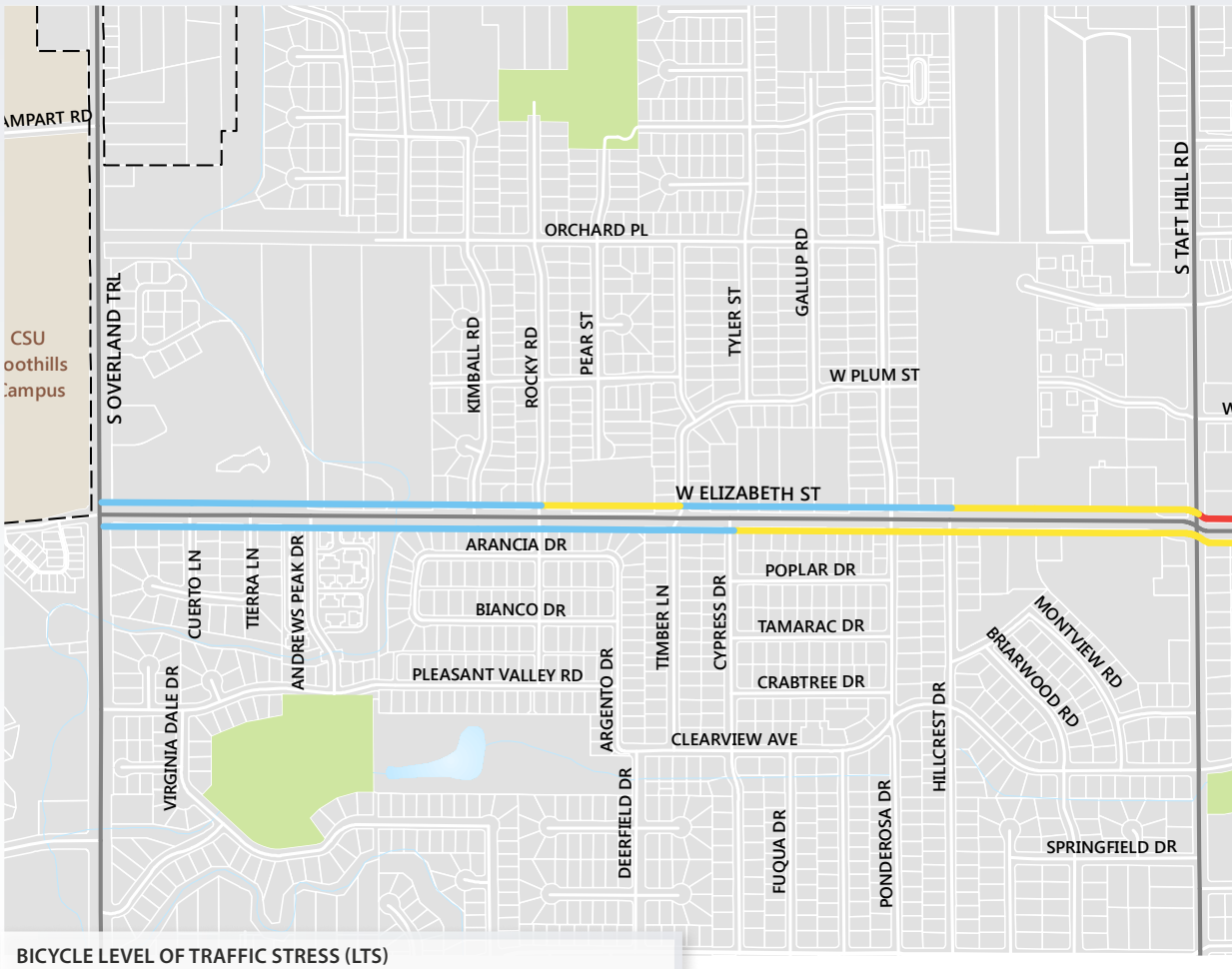


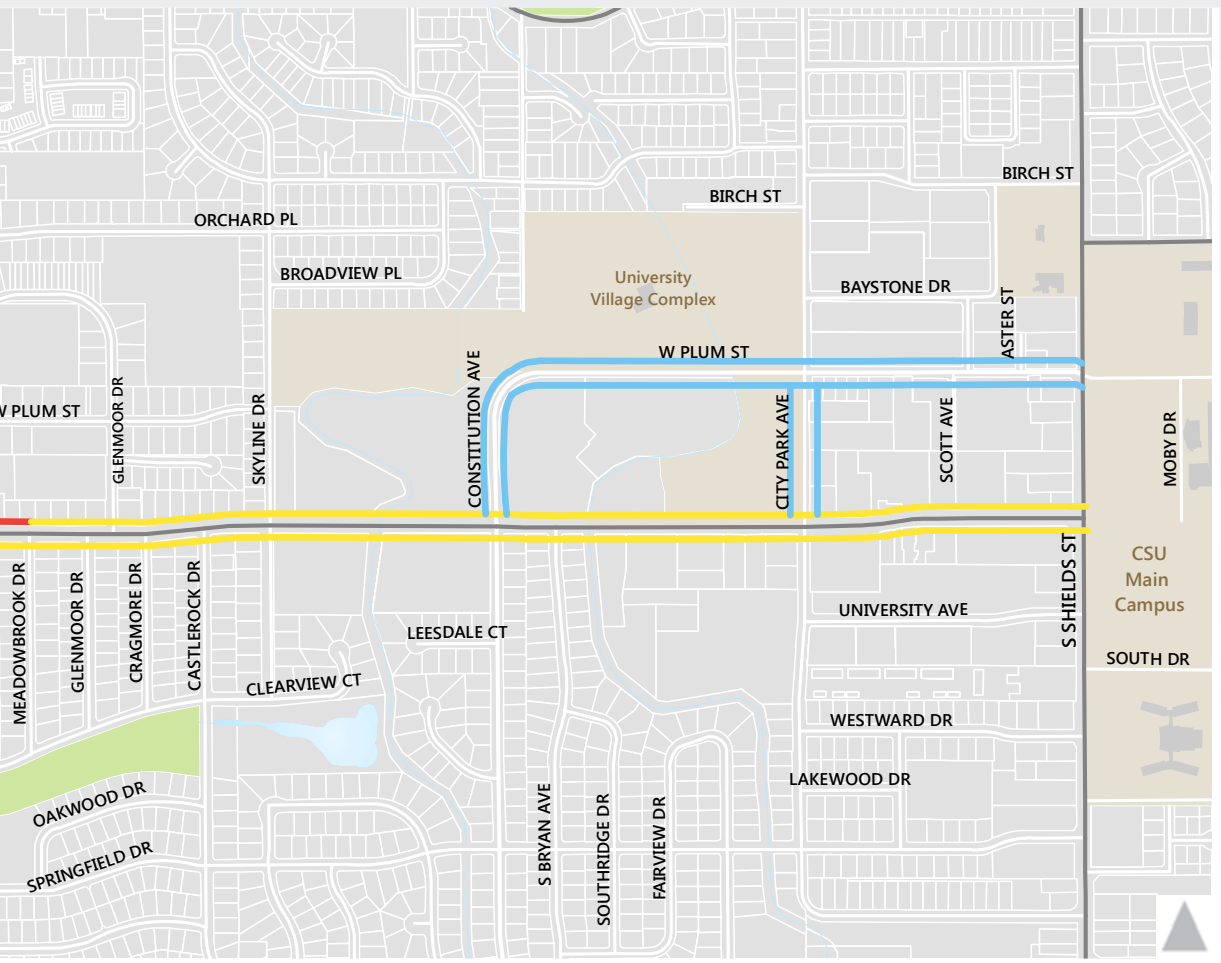
FIGURE 39: Bicycle Level of Traffic Stress (LTS)



BICYCLE LEVEL OF TRAFFIC STRESS (LTS)

- 2 (Low Stress)
- 3
- 5 (High Stress)

LTS applies the same methodology that is used in the 2014 Bicycle Master Plan. The score from 1-5 represents the level of bicyclist comfort based on traffic volume, speed, number of lanes, and presence and quality of the bikeway.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CITY PARK AVE
SCOTT AVE
MOBY DR
CSU
Main
Campus
MEADOWBROOK DR
GLENMOOR DR
CRAGMORE DR
CASTLEROCK DR
LEESDALE CT
CLEARVIEW CT
UNIVERSITY AVE
S SHIELDS ST
SOUTH DR
WESTWARD DR
LAKEWOOD DR
OAKWOOD DR
SPRINGFIELD DR
S BRYAN AVE
SOUTHRIDGE DR
FAIRVIEW DR

KEY FINDINGS

Bike lanes are provided on many sections of West Elizabeth Street. However, bike lanes are missing from key segments of West Elizabeth Street, including several segments west of Taft Hill Road. Bike lanes are also provided on Plum Street, Constitution Avenue and City Park Avenue.

The Fort Collins Bicycle Master Plan proposes a protected bike lane on West Elizabeth Street, buffered bike lanes on Plum Street and Constitution Avenue and a neighborhood greenway on City Park Avenue.

Over 2,000 bicyclists per day use West Elizabeth Street west of Shields Street.

Bicyclist delay at signalized intersections ranges from low to high. The lowest bicyclist delays are observed at the West Elizabeth Street/Constitution Avenue, West Elizabeth Street/City Park Avenue, Shields Street/Laurel Street, and Shields Street/Lake Street intersections. Relatively high bicyclist delays are observed at the Shields Street/Prospect Road, West Elizabeth Street/Shields Street, and West Elizabeth Street/Plum Street intersections.

Bicyclist level of traffic stress (LTS), an indication of bicyclist comfort on the corridor, is generally low (indicating relatively high comfort). Most of the corridor is LTS 3, which is sufficiently comfortable for the many residents and college students who currently ride on West Elizabeth Street. However, LTS 3 is generally too low comfort for the 'interested but concerned' bicyclist.

There are a large number of access points, particularly on West Elizabeth Street between Shields Street and Constitution Avenue. These access points create conflicts between vehicles and bikes.

SAFETY

An analysis of crash data from 2010 to 2014 reveals that the study area contains some of the City's intersections with the highest number of crashes.

Crashes involving all modes in the study are shown in **Figure 40.** The intersection with the largest number of crashes is the West Elizabeth Street/Shields Street intersection, followed by the West Elizabeth Street/Taft Hill Road and then the Shields Street/Plum intersections.

Pedestrian crashes from 2010 to 2014 in Fort Collins are shown in **Figure 41**. This map reveals that the Shields Street/Plum Street, West Elizabeth Street/Shields Street, West Elizabeth Street/Castlerock Drive and West Elizabeth Street/Taft Hill Road intersections have the highest number of pedestrian-related crashes in the study area, and some of the highest in the City. The Plum Street/City Park Avenue, West Elizabeth Street/City Park Avenue, West Elizabeth Street/Constitution Avenue and West Elizabeth Street/Ponderosa Drive intersections also have pedestrian-related crashes.

Figure 42 shows bicycle-related crashes in the study area. The West Elizabeth Street/City Park Avenue intersection has the highest number of bicycle-related crashes in the study area, followed by the West Elizabeth Street/Taft Hill Road and West Elizabeth Street/Shields Street intersections.

Table 12 and **Table 13** show crash screening information used to identify locations with more crashes than expected on West Elizabeth.

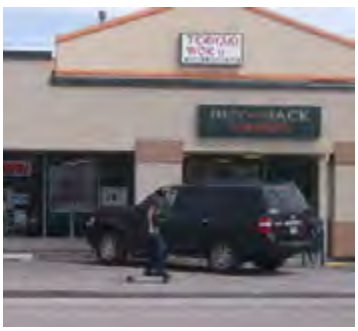
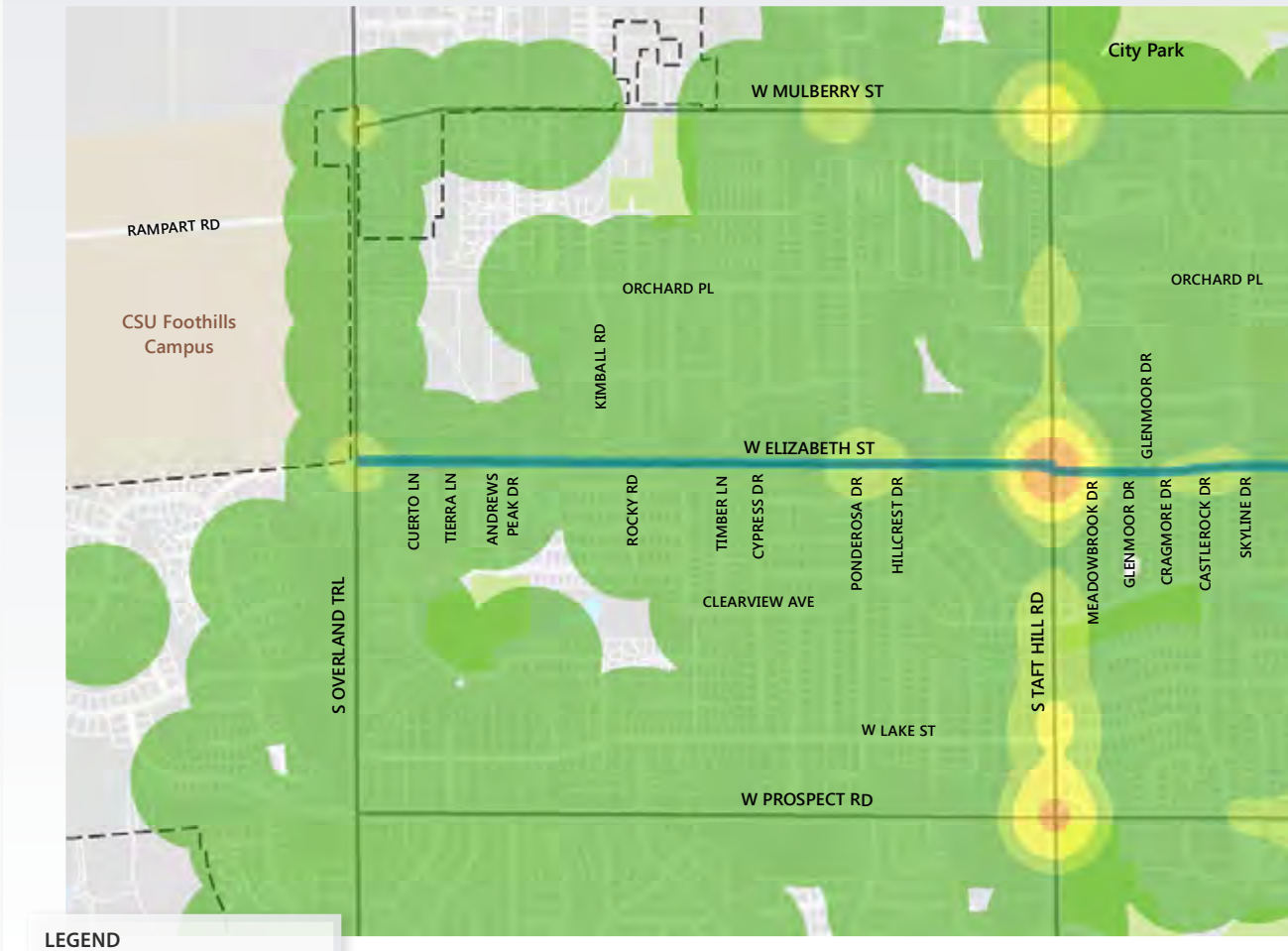


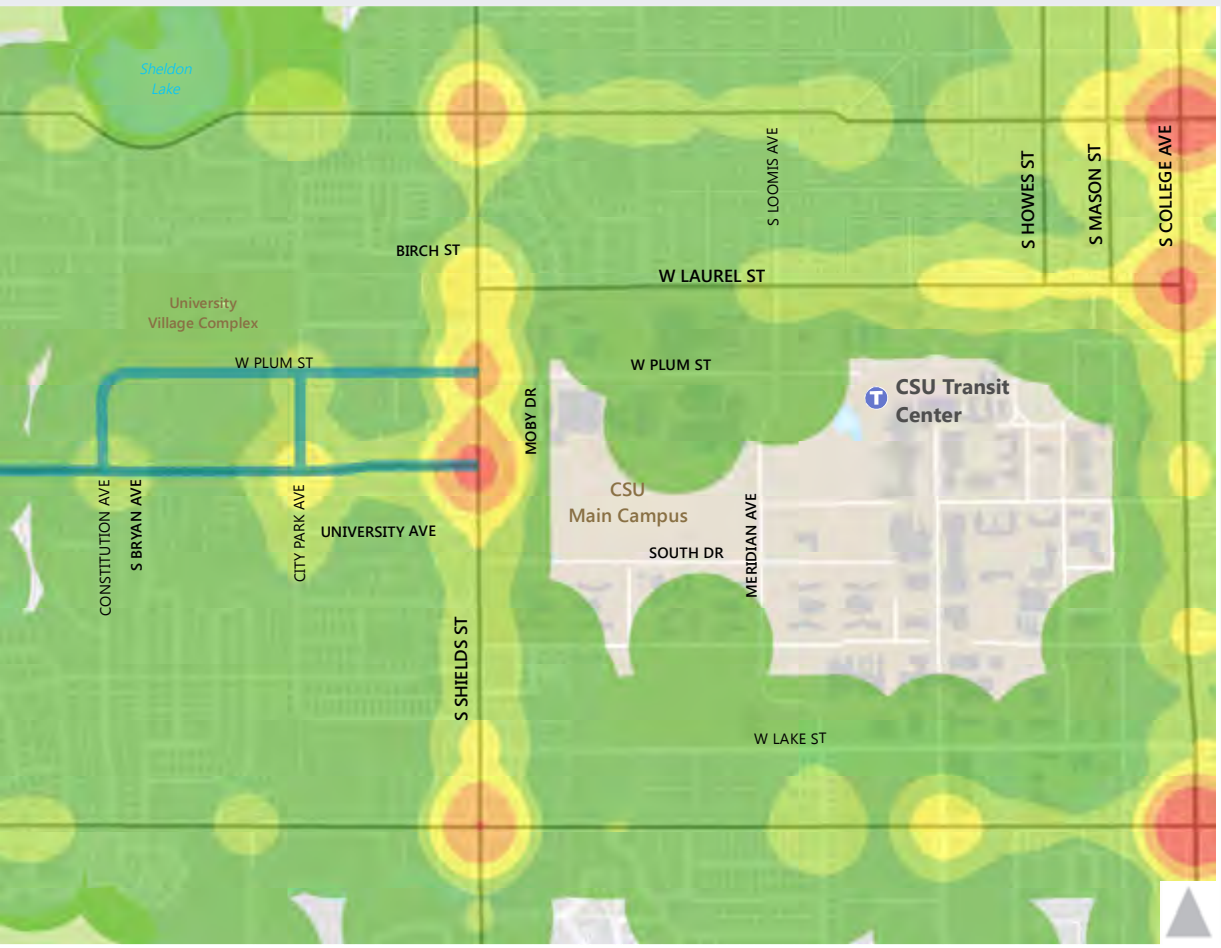
FIGURE 40: All Crashes 2010-2014



LEGEND

- 1-8
- 9-32
- 33-78
- 79-144
- 145+
- West Elizabeth Street Study Corridor
- City Boundary

Source: City of Fort Collins, 2014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CSU Main Campus
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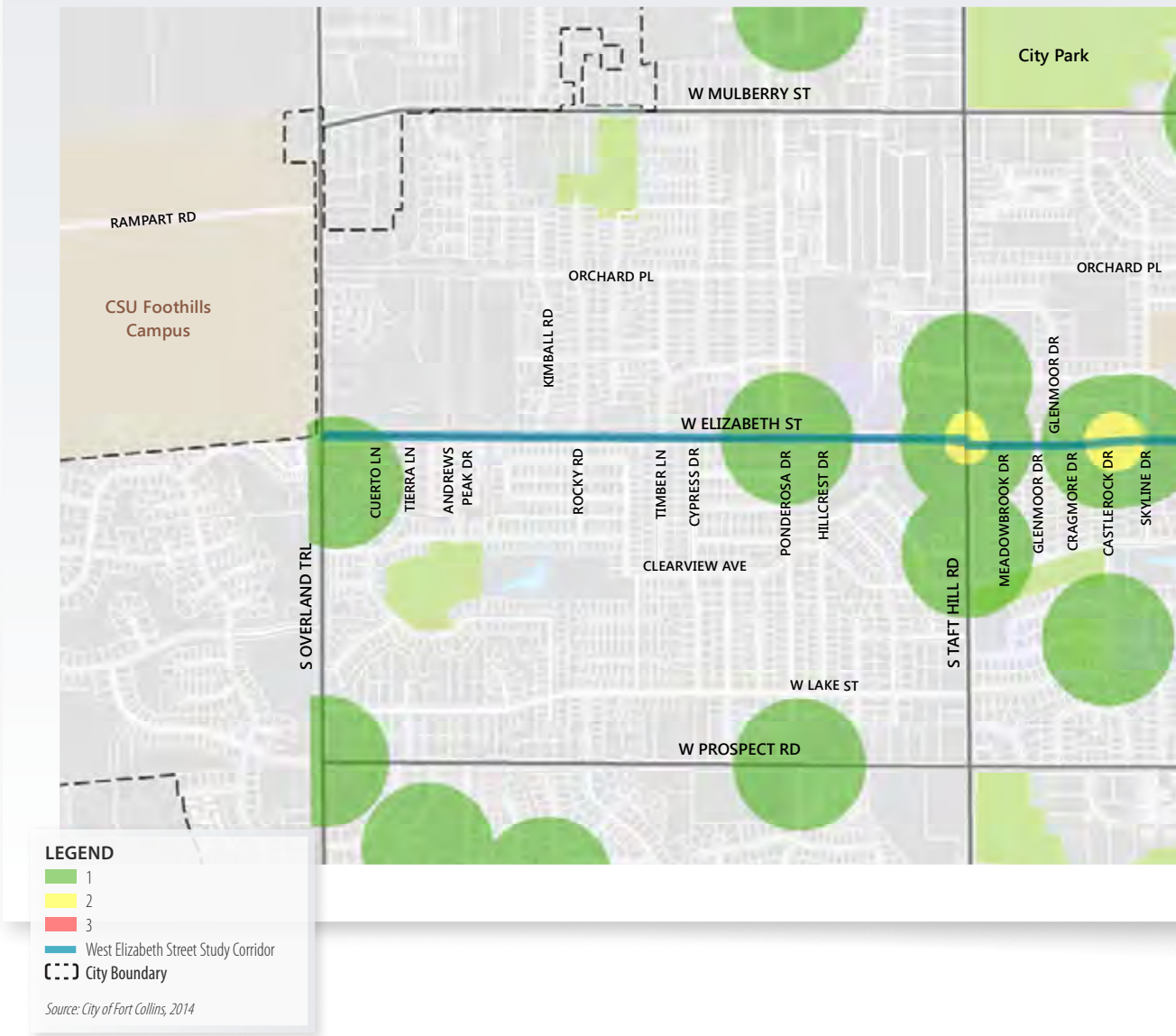
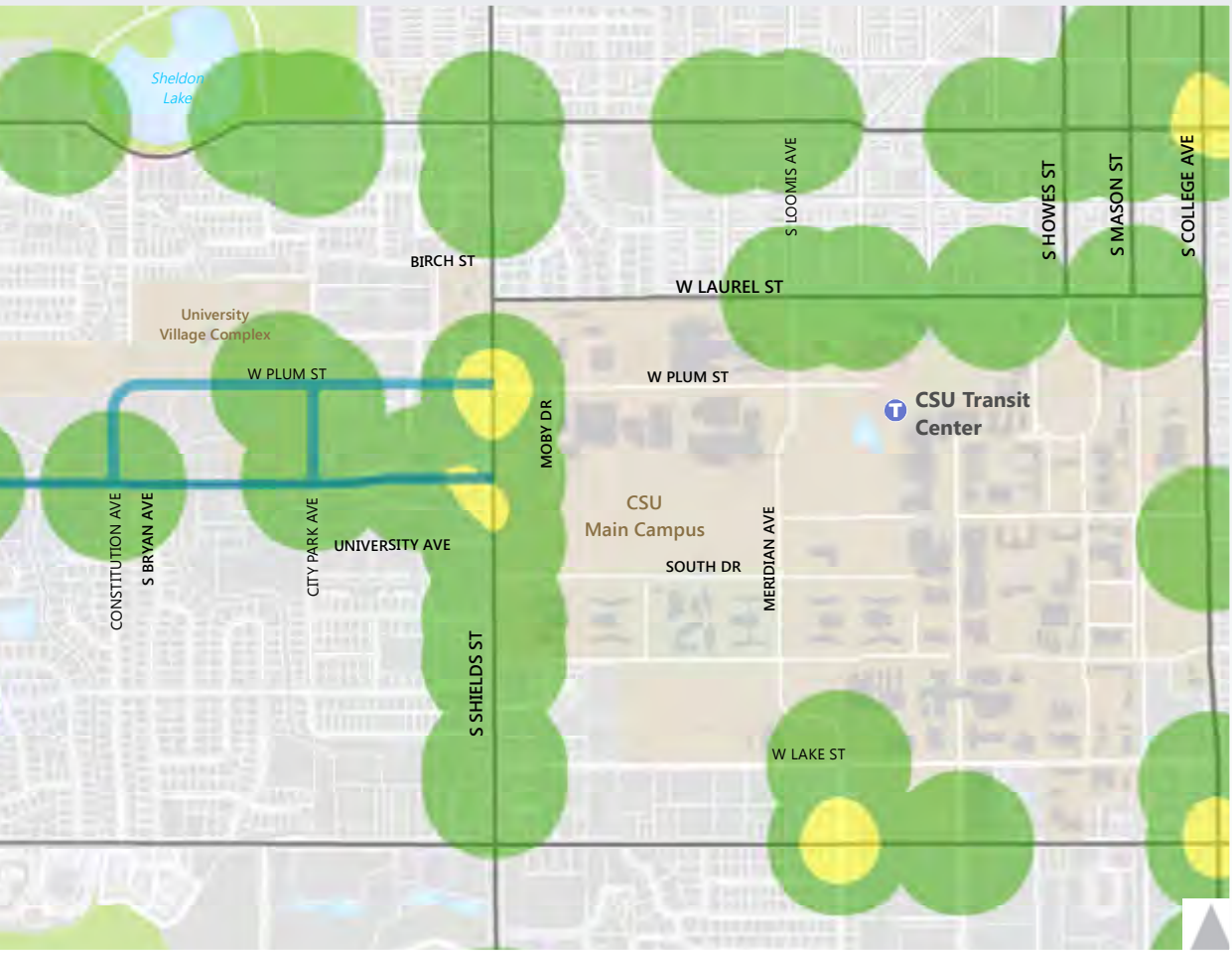
W LAKE ST

FIGURE 41: Pedestrian Crashes 2010-2014

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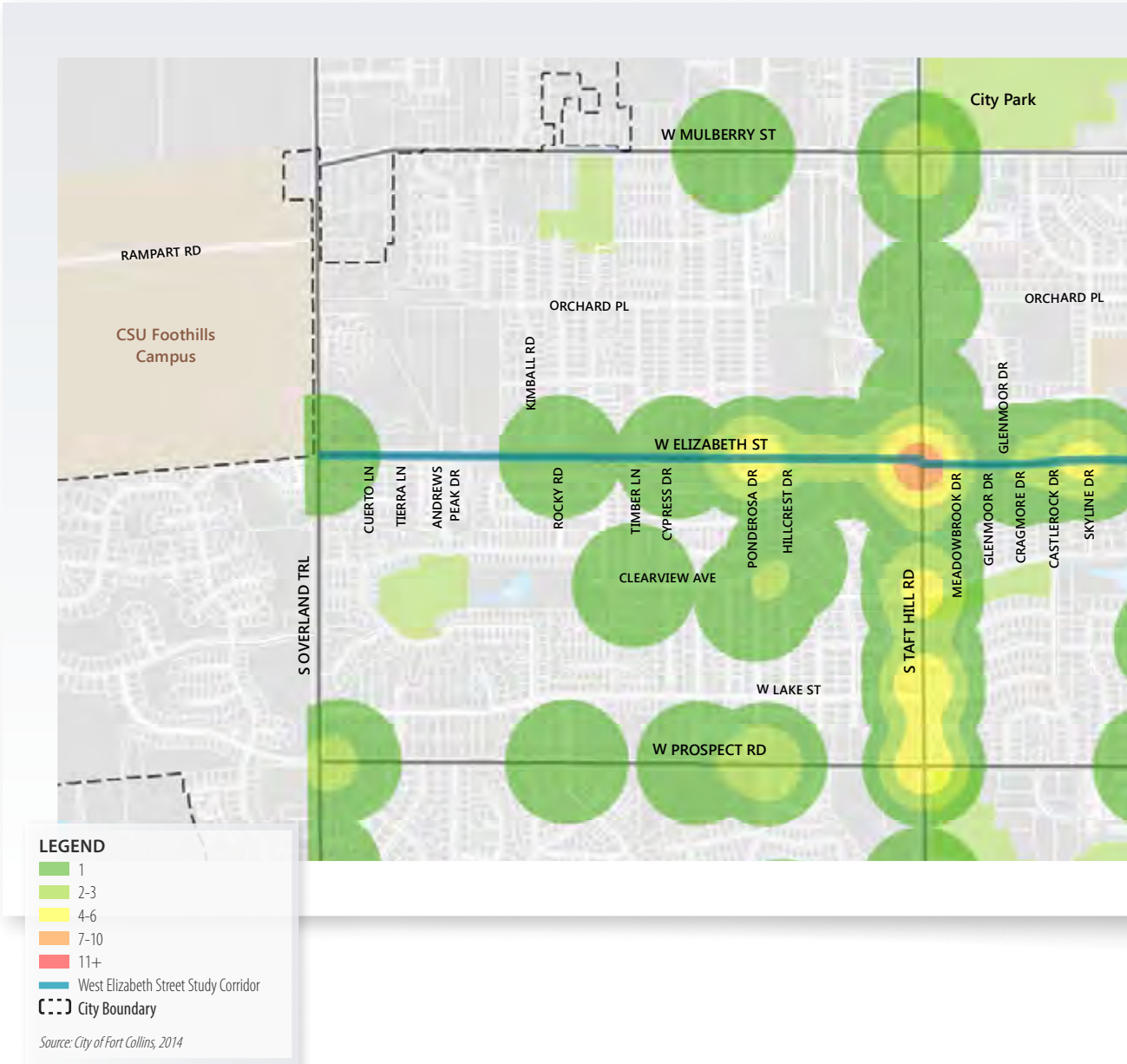
W LAKE ST

FIGURE 42: **Bicycle Crashes 2010-2014**

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CSU Transit Center
CSU Main Campus
CONSTITUTION AVE
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CITY PARK AVE
UNIVERSITY AVE
SOUTH DR
MERIDIAN AVE
S SHIELDS ST
W LAKE ST

TABLE 12: West Elizabeth Intersection Crashes (2010-2014)

Street	Cross Street	Entering Volume *(vehicles per day)*	# of Crashes	# of Injury Crashes	# of Bike Crashes	# of Pedestrian Crashes
Shields Street	West Elizabeth Street	46,350	**154**	**28**	3	2
City Park Avenue	West Elizabeth Street	21,450	32	10	**15**	0
Bryan Avenue	West Elizabeth Street	16,000	5	2	2	0
Constitution Avenue	West Elizabeth Street	18,000	14	7	2	1
Skyline Drive	West Elizabeth Street	17,550	6	5	3	0
Castlerock Drive	West Elizabeth Street	16,700	4	2	1	1
Cragmore Drive	West Elizabeth Street	16,700	2	1	1	0
Glenmoor Drive	West Elizabeth Street	16,700	2	0	0	0
Meadowbrook Drive	West Elizabeth Street	16,700	1	1	1	0
Taft Hill Road	West Elizabeth Street	35,950	70	16	2	2
Hillcrest Drive	West Elizabeth Street	9,300	1	0	0	0
Ponderosa Drive	West Elizabeth Street	10,300	12	6	**4**	1
Cypress Drive	West Elizabeth Street	6,500	1	0	0	0
Timber Lane	West Elizabeth Street	6,000	2	1	0	0
Rocky Road	West Elizabeth Street	5,500	1	0	0	0
Kimball Road	West Elizabeth Street	5,000	0	0	0	0
Andrews Peak Drive	West Elizabeth Street	4,400	0	0	0	0
Tierra Lane	West Elizabeth Street	4,400	0	0	0	0
Cuerto Lane	West Elizabeth Street	4,400	0	0	0	0
Overland Trail	West Elizabeth Street	13,550	**17**	1	1	0

Notes: Bold *and underlined text indicates more crashes than expected compared to similar locations*
Bold *text indicates slightly more crashes than expected compared to similar locations*
Source: City of Fort Collins – Traffic Operations

Table 12 shows that the West Elizabeth Street/Shields Street intersection has more crashes than expected compared to similar locations and slightly more injury crashes than expected compared to similar locations. The West Elizabeth Street/City Park Avenue intersection has more bike crashes than expected compared to similar locations. The West Elizabeth Street/Ponderosa Road intersection and West Elizabeth Street/Overland Trail intersection also have slightly more crashes than expected. There were no fatalities in the study area during this period.

The intersection with the largest number of crashes is the West Elizabeth Street/Shields Street intersection, followed by the West Elizabeth Street/Taft Hill Road and then the Shields Street/Plum intersections.

Table 13 presents data for crashes between intersections (segments). The table shows that West Elizabeth Street from Shields Street to City Park Avenue has more crashes, injury crashes, and bike crashes than expected compared to similar locations. West Elizabeth Street from City Park Avenue to Constitution Avenue has slightly more crashes, injury crashes, and bike crashes than expected compared to similar locations. West Elizabeth Street from Taft Hill Road to Ponderosa Drive has more crashes, injury crashes, bike crashes, and pedestrian crashes than expected when compared to similar locations. There were no fatalities in the study area during this period.

TABLE 13: West Elizabeth Non-Intersection Crashes (2010-2014)

Block #	Description	Segment Length *(miles)*	ADT	# of Crashes	# of Injury Crashes	# of Bike Crashes	# of Pedestrian Crashes
1100 - 1399	Shields Street – City Park Avenue	0.24	18,350	**59**	**15**	**11**	2
1400 - 1599	City Park Avenue – Constitution Avenue	0.26	16,000	**19**	**8**	**5**	0
1600 - 1899	Constitution Avenue – Skyline Drive	0.19	16,200	3	0	0	**0**
1900 – 2099	Skyline Drive – Taft Hill Road	0.26	15,000	8	3	1	**2**
2100 – 2399	Taft Hill Road – Ponderosa Drive	0.26	11,000	**38**	**11**	**9**	**3**
2400 – 2599	Ponderosa Drive – Timber Lane	0.18	6,000	7	1	1	**0**
2600 – 3099	Timber Lane to Overland Trail	0.5	4,400	2	1	0	**0**

Notes: Bold *and underlined text indicates more crashes than expected compared to similar locations*
Bold *text indicates slightly more crashes than expected compared to similar locations*
Source: City of Fort Collins – Traffic Operations

DETAILED EVALUATION OF HIGH CRASH LOCATIONS

Intersections

West Elizabeth Street/ Shields Street

This is a signalized intersection with a predominant crash type of rear end crashes. Sideswipe crashes on the eastbound approach are also common. There is higher than normal congestion at the intersection due to lane configuration. Required split phasing east-west contributes to rear end crash potential and a higher than normal crash frequency. In 2014, about 30% of collisions occurred on Shields Street, 60% on Elizabeth Street and 10% in the center of the intersection.

West Elizabeth Street/ City Park Avenue

This is a signalized intersection with a predominant crash type of bicycle-related crashes (six approach turns, five right hooks and four right-angle bike crashes). The high volume of cyclists is a likely contributor (over 2,000 bikes per day counted on West Elizabeth Street). Five out of six approach turn crashes were at night with unlit bikes. Traffic signal violations are another contributing factor to bike approach turn crashes.

West Elizabeth Street/ Skyline Drive

This is a two-way stop controlled intersection northbound/ southbound. The predominant crash type is bicycle-related crashes (two right-angle and one sideswipe-opposite directions). The large bike volume is a likely contributor. One bike crash involved a wrong-way sidewalk rider and one occurred after midnight.

West Elizabeth Street/ Ponderosa Drive

This is a two-way stop controlled intersection northbound/ southbound. The predominant crash type is bicycle-related crashes (one right-angle, one approach turn, one right hook and one unknown). The large bike volume is a likely contributor.

West Elizabeth Street/ Overland Trail

This is a two-way stop controlled intersection eastbound/ westbound. The predominant crash type is right-angle crashes involving westbound motorists. All the right-angle crashes resulted from a failure to yield after stopping at the stop sign. Four of the nine right-angle crashes noted a non-contact vehicle (three of which were Transfort buses) in the northbound right turn lane that obstructed views. This intersection does not currently meet warrants for a traffic signal.

Segments

West Elizabeth Street from Shields Street to City Park Avenue

This segment has four travel lanes and a striped center turn lane. It has heavy commercial activity and numerous driveway access points. The predominant crash type is right-angle crashes (24 crashes) at driveways – nearly all of which occurred during a left turn attempt from a driveway onto West Elizabeth Street. Sixteen out of 24 right-angle crashes were at driveways on the south side of West Elizabeth. There have also been 11 bike crashes (four approach turns, four right-angle and four right hooks). All of the bike crashes occurred at driveways. There were also two pedestrian crashes. One was a multiple-threat crash in the mid-block crossing equipped with flashing yellow beacons and the other was an overtaking turn at a driveway.

West Elizabeth Street from City Park Avenue to Constitution Avenue

This segment has four travel lanes and a striped center turn lane. There have been five bike crashes (two approach turns,

three right-angle – in all of which the bicyclist riding against traffic) all at driveways. There have also been five right-angle crashes, all at driveways (four on the south side of West Elizabeth).

West Elizabeth Street from Taft Hill Road to Ponderosa Drive

This segment has two travel lanes, a striped center turn lane, and a continuous right turn lane in the westbound direction starting about 120 feet west of Taft Hill. There have been ten right-angle crashes, all at driveways (five on the north side and five on the south side). There have been nine bicycle crashes (five approach turns four of which were at King Soopers driveway(s), three right-angle and one overtaking turn) all at driveway accesses. Westbound drivers are making left turns through the queue of cars eastbound stopped at Taft Hill. The queue blocks the westbound drivers' view of bicyclists in the adjacent bike lane. There have also been eight rear end crashes, all at driveways. There have been three pedestrian crashes, two of which involved turning vehicles at apartment driveways and one of which was after midnight with an inebriated pedestrian walking in the street.

See **Appendix D** for crash diagrams at the West Elizabeth Street/Shields Street intersections, West Elizabeth Street/City Park Avenue, West Elizabeth Street/Skyline Drive, West Elizabeth Street/Ponderosa Drive, and West Elizabeth Street/ Overland Trail. **Table 14** shows a summary of crash trends.

TABLE 14: Crash Type Summary

Location	Predominant Crash Type	Contributing Factors
Intersections		
West Elizabeth Street/ Shields Street	Rear end, sideswipe	Intersection congestion and split phasing
West Elizabeth Street/ City Park Avenue	Bicycle-related	High volume of bikes, traffic signal violations, nighttime crashes with unlit bikes
West Elizabeth Street/ Skyline Drive	Bicycle-related	High volume of bikes
West Elizabeth Street/ Ponderosa Drive	Bicycle-related	High volume of bikes
West Elizabeth Street/ Overland Trail	Right-angle	Failure to yield at stop sign after stopping
Segments		
West Elizabeth Street: Shields to City Park	Right-angle	Failure to yield at driveway
West Elizabeth Street: City Park to Constitution	Bicycle-related, right-angle	Wrong way riding, failure to yield
West Elizabeth Street: Taft Hill to Ponderosa	Right angle, bicycle-related	Failure to yield, queue blocking visibility of bicyclists

KEY FINDINGS

The West Elizabeth Street/Shields Street intersection has more crashes than expected compared to similar locations and slightly more injury crashes than expected compared to similar locations. The predominant crash type is rear end crashes; sideswipe crashes on the eastbound approach are also common.

The West Elizabeth Street/City Park Avenue intersection has more bike crashes than expected compared to similar locations. Traffic signal violations and nighttime crashes with unlit bikes are a contributing factor to bike approach turn crashes.

West Elizabeth Street from Shields Street to City Park Avenue has more crashes, injury crashes, and bike crashes than expected compared to similar locations. The predominant crash type is right angle crashes at driveways, nearly all of which occurred during a left-turn attempt from a driveway onto West Elizabeth Street.

West Elizabeth Street from City Park Avenue to Constitution Avenue has slightly more crashes, injury crashes, and bike crashes than expected compared to similar locations.

West Elizabeth Street from Taft Hill Road to Ponderosa Drive has more crashes, injury crashes, bike crashes and pedestrian crashes than expected compared to similar locations.

DELAY BY MODE

Table 15 and **Table 16** show the peak hour volumes for each mode. **Figure 43** and **Figure 44** also show peak hour volumes by transportation mode (vehicle, pedestrians, bicyclists, and transit users). The Shields Street/ Plum Street intersection has the highest number of pedestrians and bicyclists during both the AM and PM Peak hours, but pedestrian and bicyclist volumes are present at all of the study intersections on West Elizabeth Street. Higher volumes are typically seen in the PM peak hour, as compared to the AM peak hour.

TABLE 15: AM Peak Volume by Mode

Intersection	Vehicle Drivers & Passengers	Transit Passengers	Pedestrians	Bicyclists	Total
1. West Elizabeth at Overland Trail	976	29	25	2	1,032
2. West Elizabeth at Taft Hill	2,340	59	72	17	2,488
3. West Elizabeth at Constitution	801	106	77	9	993
4. West Elizabeth at City Park	971	93	147	36	1,247
5. West Elizabeth at Shields	2,339	85	164	68	2,656
6. Plum at Shields	2,022	222	194	91	2,529

TABLE 16: PM Peak Volume by Mode

Intersection	Vehicle Drivers & Passengers	Transit Passengers	Pedestrians	Bicyclists	Total
1. West Elizabeth at Overland Trail	1,170	32	89	12	1,303
2. West Elizabeth at Taft Hill	2,962	90	114	50	3,216
3. West Elizabeth at Constitution	1,484	169	150	40	1,843
4. West Elizabeth at City Park	1,896	132	194	129	2,351
5. West Elizabeth at Shields	3,846	61	173	134	4,214
6. Plum at Shields	2,950	312	203	131	3,596

FIGURE 43: Existing Conditions AM Peak Hour Volumes by Mode

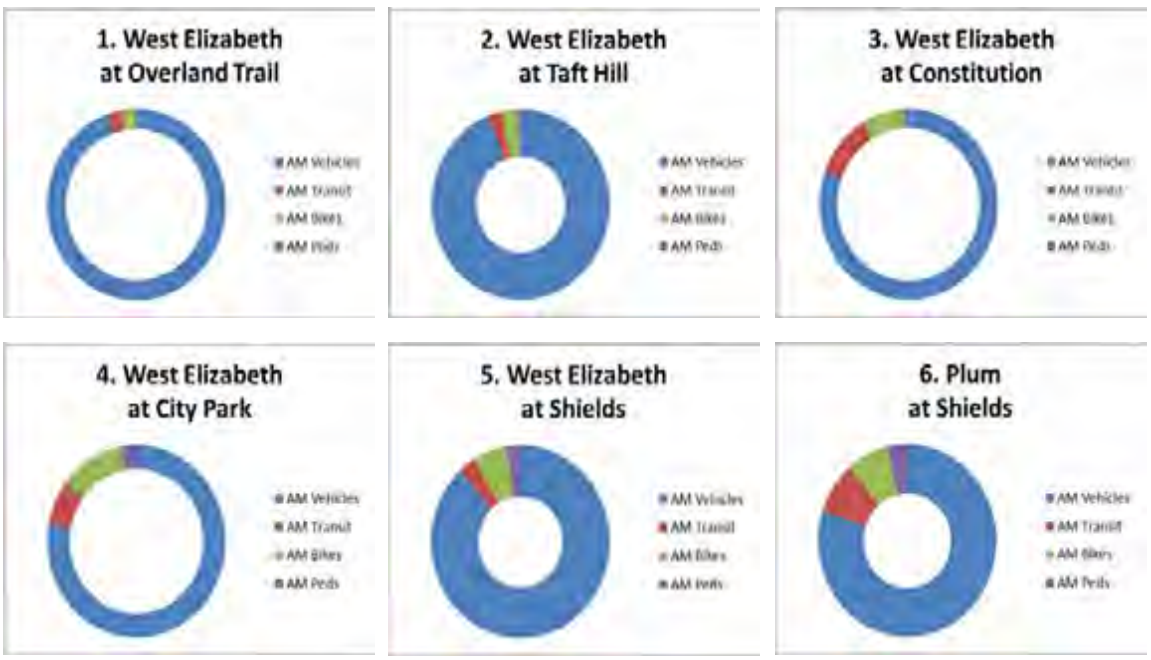
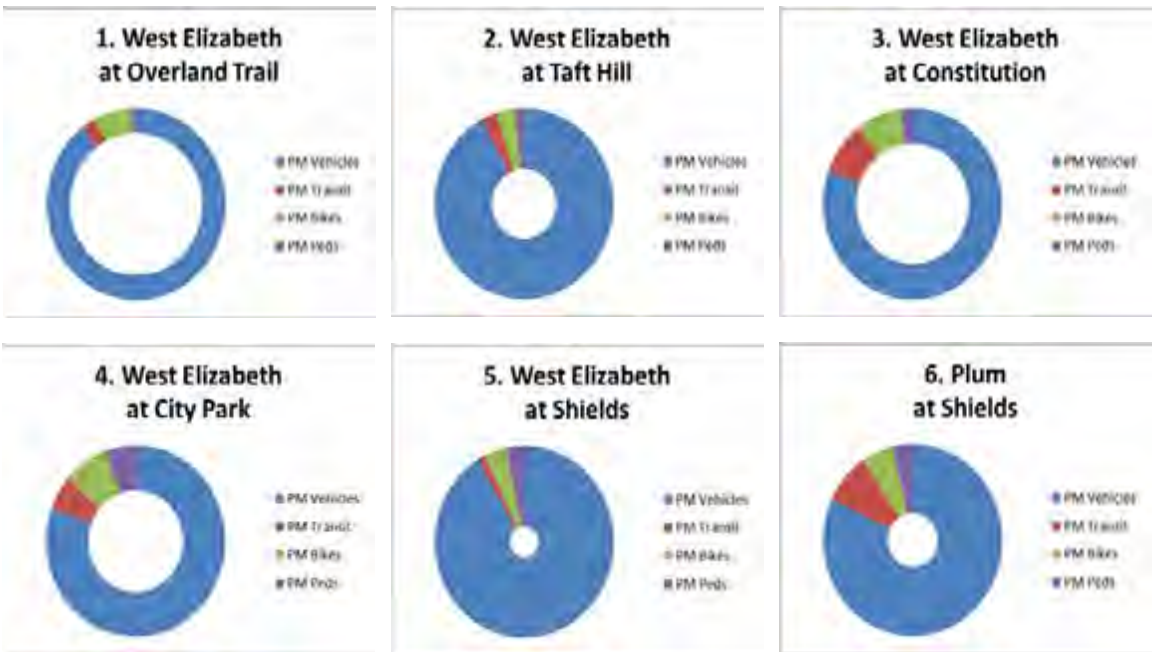


FIGURE 44: Existing Conditions PM Peak Hour Volumes by Mode



Mobility-based performance measures, such as person-delay, can complement comfort-based performance measures and accessibility-based performance measures (such as the bicycle Level of Traffic Stress and the pedestrian level of service presented earlier in this report) to help more thoroughly explain intersection and corridor performance and the underlying reasons why people travel the way they do.

The calibrated Vissim model to measure corridor performance for vehicles, transit, bicyclists and pedestrians was used to calculate mobility-based performance measures at the person level.

Analysis of American Community Survey Means of Transportation to Work data revealed that average vehicle occupancy in Fort Collins is approximately 1.1 persons per vehicle.

Estimates of person delay by mode account for delay incurred by each mode at intersections as well as the number of people using each mode at the intersection, accounting for average vehicle occupancy in Fort Collins and transit ridership. Analysis of American Community Survey Means of Transportation to Work data revealed that average vehicle occupancy in Fort Collins is approximately 1.1 persons per vehicle. Transfort provided transit ridership data from the Automatic Passenger Counters (APCs), and the City provided bicyclist and pedestrian count data.

Table 17 and **Table 18** show total person delay by mode at signalized intersections in the study area during the AM and PM peak hour, respectively. **Appendix B** includes detailed calculations. These tables show that in many cases delay incurred by vehicle drivers and passengers constitutes most of the peak hour delay incurred by all people at study intersections, especially at some of the study area's busiest intersections, such as the West Elizabeth Street/ Taft Hill Road, West Elizabeth Street/Shields Street, and Shields Street/Prospect Road intersections. However, at some of the study area's intersections with lower vehicle volumes, delay incurred by transit passengers, pedestrians, and bicyclists constitutes a substantial portion of overall person delay. For example, delay incurred by transit passengers, pedestrians,

and bicyclists constitutes over 30 percent of overall person delay at the West Elizabeth Street/Constitution Avenue, West Elizabeth Street/City Park Avenue, and Shields Street/Plum Street intersections during both the AM and PM peak hours. At the Shields Street/Plum Street intersection, transit passenger, pedestrian, and bicyclist delay constitutes 55 percent and 46 percent of overall person delay during the AM and PM peak hours, respectively. It is important to consider not only level of service, but person-mobility as we plan for the future in order to reduce delay for vehicles, transit, pedestrians and bicyclists.

TABLE 17: AM Peak Hour Person Delay by Mode (Minutes)

Intersection	Control	Vehicle Drivers & Passengers	Transit Passengers	Pedestrians	Bicyclists	Total	% Transit, Ped. & Bike
West Elizabeth Street/ Overland Trail	Side-Street Stop	N/A – side-street stop intersection					
West Elizabeth Street/ Taft Hill Road	Signal	949	66	9	35	1,059	10%
West Elizabeth Street/ Constitution Avenue	Signal	82	34	3	13	132	38%
West Elizabeth Street/ City Park Avenue	Signal	131	36	12	21	200	35%
West Elizabeth Street/ Shields Street	Signal	819	57	80	96	1,052	22%
Shields Street/ Plum Street	Signal	310	191	93	89	683	55%
Shields Street/ Laurel Street	Signal	472	4	26	9	511	8%
Shields Street/ Lake Street	Signal	285	1	43	9	338	16%
Shields Street/ Prospect Road	Signal	4,067	123	57	52	4,299	5%

TABLE 18: PM Peak Hour Person Delay by Mode (Minutes)

Intersection	Control	Vehicle Drivers & Passengers	Transit Passengers	Pedestrians	Bicyclists	Total	% Transit, Ped. & Bike
West Elizabeth Street/ Overland Trail	Side-Street Stop	N/A – side-street stop intersection					
West Elizabeth Street/ Taft Hill Road	Signal	1,832	89	48	61	2,030	10%
West Elizabeth Street/ Constitution Avenue	Signal	247	76	14	23	360	31%
West Elizabeth Street/ City Park Avenue	Signal	477	130	115	33	755	37%
West Elizabeth Street/ Shields Street	Signal	2,801	18	151	89	3,059	8%
Shields Street/ Plum Street	Signal	754	368	146	117	1,385	46%
Shields Street/ Laurel Street	Signal	1,259	29	63	5	1,356	7%
Shields Street/ Lake Street	Signal	645	9	21	8	683	6%
Shields Street/ Prospect Road	Signal	3,948	35	82	24	4,089	3%

KEY FINDINGS

The Plum Street/Shields Street intersection has the largest number of transit passengers, bicyclists and pedestrians in the study area (almost 650 during the PM peak hour).

Other intersections with a large number of transit passengers, bicyclists and pedestrians include the West Elizabeth Street/City Park Avenue intersection (455 during the PM peak hour), the West Elizabeth Street/Shields Street intersection (almost 370 during the PM peak hour) and the West Elizabeth Street/Constitution Avenue intersection (almost 360 during the PM peak hour).

Delay incurred by vehicle drivers and passengers constitutes most of the peak hour delay incurred by all corridor users at study intersections, especially at some of the study area's busiest intersections including the West Elizabeth Street/Taft Hill Road, West Elizabeth Street/Shields Street, and Shields Street/Prospect Road intersections.

At some of the study area's intersections with lower vehicle volumes, delay incurred by transit passengers, pedestrians and bicyclists constitutes a substantial portion of overall person delay.

Delay incurred by transit passengers, pedestrians and bicyclists constitutes over 30 percent of overall person delay at the West Elizabeth Street/Constitution Avenue, West Elizabeth Street/City Park Avenue, and Shields Street/Plum Street intersections during both the AM and PM peak hours.

At the Shields Street/Plum Street intersection, transit passenger, pedestrian and bicyclist delay constitutes 55 percent and 46 percent of overall person delay during the AM and PM peak hours, respectively.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STOP

Section 4

COMMUNITY ENGAGEMENT

The West Elizabeth Enhanced Travel Corridor Plan process began Spring 2015. From the beginning, a high priority was to directly engage residents, businesses, and stakeholders in an effective, meaningful, and equitable way to ensure their interests and concerns would be heard and that their ideas would be reflected in the future vision for the corridor.

COMMUNITY ENGAGEMENT

HIGH-TECH TOOLS & BROADCAST MEDIA

- Online Surveys
- Online WikiMap
- Electronic Polling
- Press Releases
- News Articles
- Postcard Mailings
- Email Notifications
- Flyers
- Posters

PUBLIC ACTIVITIES & EVENTS

- Neighborhood Listening Sessions
- Walking, Biking & Transit Tours
- Open Streets
- Focus Groups
- Technical Advisory Committee Meetings
- Stakeholder Committee Meetings

KEY STAKEHOLDERS

- Neighborhood Residents
- Business Owners
- CSU Students, Faculty, Staff & Administration
- Property Owners
- Local Developers
- HOAs & Neighborhood Associations
- Multi-family Housing Managers
- Alternative Transportation Advocates
- Safe Routes to School
- City Boards & Commissions
- City Departments

OUTREACH STRATEGIES

Three strategies for public engagement were used through the Corridor Understanding (Phase 1) of the planning process: high-tech tools and broadcast media; public activities and events; and outreach to boards and committees. These events and tools were used to:

- Explain the planning process and how the West Elizabeth ETC relates to other planning efforts
- Set the foundation for an ongoing dialogue about the issues, needs, vision, and priorities for the corridor
- Seek to understand current and future opportunities, issues, and needs for the area

PHASE 1 OUTREACH EVENTS

MARCH

CSU Housing Fair: March 4

CSU Conservation Leadership Through Learning Class: March 9

APRIL

CSU Bicycle Advisory Committee: April 9

CSU Built Environment Class: April 13

CSU Earth Day Fair: April 22

Associated Students of CSU Meeting: April 22

Bicycle Advisory Committee: April 27

Neighborhood Listening Session: April 29

MAY

Neighborhood Listening Session: May 4

City Joint Planning Open House: May 6

Planning & Zoning Board: May 8

Neighborhood Walking, Biking & Transit Tours: May 11-14

Transfort Shift Meetings: May 13

Senior Advisory Board: May 13

Technical Advisory Committee Meeting #1: May 19

Transportation Board: May 20

Transfort Employee Engagement: May 28

JUNE

Open Streets: June 7

JULY

Woodbridge Senior Housing Listening Session: July 1

Focus Group Meeting: July 8

Stakeholder Committee Meeting #1: July 8

CSU Bicycle Advisory Committee: July 9

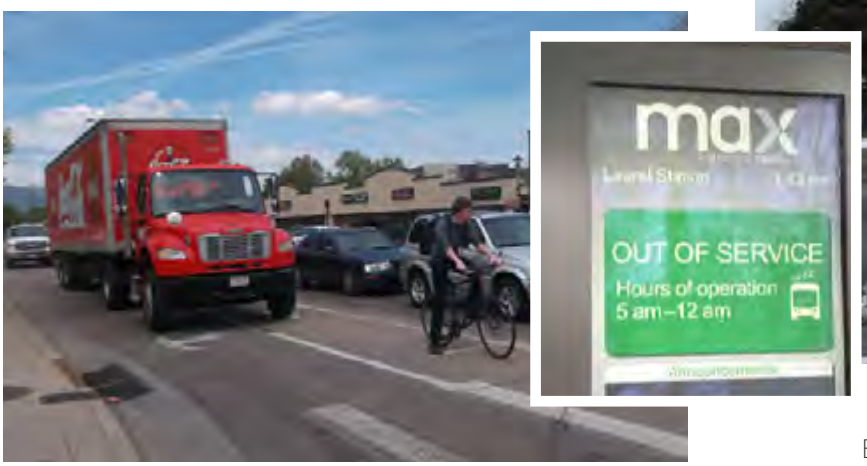
North Front Range MPO TAC Meeting: July 15

WHAT WE'VE HEARD

During the public engagement process to gather input on existing conditions, several common themes regarding the current experience of traveling in the corridor emerged. Below are key themes organized by transportation mode. Please see **Appendix E** for additional outreach details.

DRIVING

- Challenging to make left turns to and from driveways
- Conflicts with pedestrians and bicyclists
- Speeding
- Sight distance issues



Challenges exist between cars, bikes, and pedestrians in heavily trafficked areas such as Campus West where multiple access points exist to reach local businesses and housing.

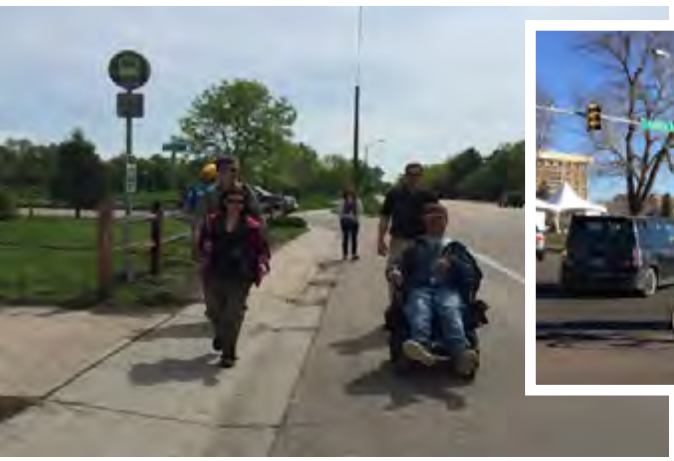
TRANSIT

- Overcrowded buses, people are left behind
- Not enough bus stop amenities
- Not enough service (e.g., late-night, weekend, summer)

Bus stops across the corridor often lack benches, shelters, as well as ADA-compliant adjacent sidewalks, and loading pads.

WALKING

- Inconsistent facilities, lack of sidewalks
- Not comfortable
- Largely not ADA-complaint
- Hard to cross West Elizabeth Street at key intersections
- Lack of sufficient midblock crossing opportunities



Several portions of West Elizabeth are not ADA-compliant, forcing people using mobility devices to travel in bike lanes next to vehicular traffic.

BIKING

- Inconsistent facilities in west segment
- Lots of driveway conflicts in Campus West
- Challenging intersections (e.g., West Elizabeth at Taft Hill, City Park, Shields)
- High number of cyclist crashes

Bicycle facilities are inconsistent, disappearing or turning into shared lane conditions in the western portion of the corridor.


33 EASTBOUND
Transfort
Bigger salads.
Even bigger
smiles.
McALISTER'S

Section 5

SUMMARY

The West Elizabeth Corridor's context is unique in the City of Fort Collins. Previous planning efforts have identified needs for a corridor-focused plan to meet the Transportation Master Plan's vision of an Enhanced Travel Corridor that emphasizes high-frequency transit, bicycling, and walking.

SUMMARY

The West Elizabeth Corridor currently performs well in some areas while other areas can be improved. **Figure 45** shows multimodal performance in the corridor that combines level of service for all modes: vehicles, transit, pedestrians and bicyclists. Several segments of the corridor have a low pedestrian level of service which reflects a low level of comfort. Bicyclist level of traffic stress indicates a relatively high level of comfort; however, the comfort of existing bicycling infrastructure is not high enough to serve lower-confidence bicyclists and does not consider the conflict caused by high traffic access points. Transit level of service, primarily a measure of stop amenities and transit access by walking and biking, is relatively high. However, deeper analysis of the corridor's transit ridership and operations reveals areas for improvement. Vehicle operations on the corridor are generally good although there are some intersections which experience congestion during peak hour.

Future steps of the West Elizabeth Enhanced Travel Corridor Plan development process will build upon the findings of this Corridor Understanding Report.

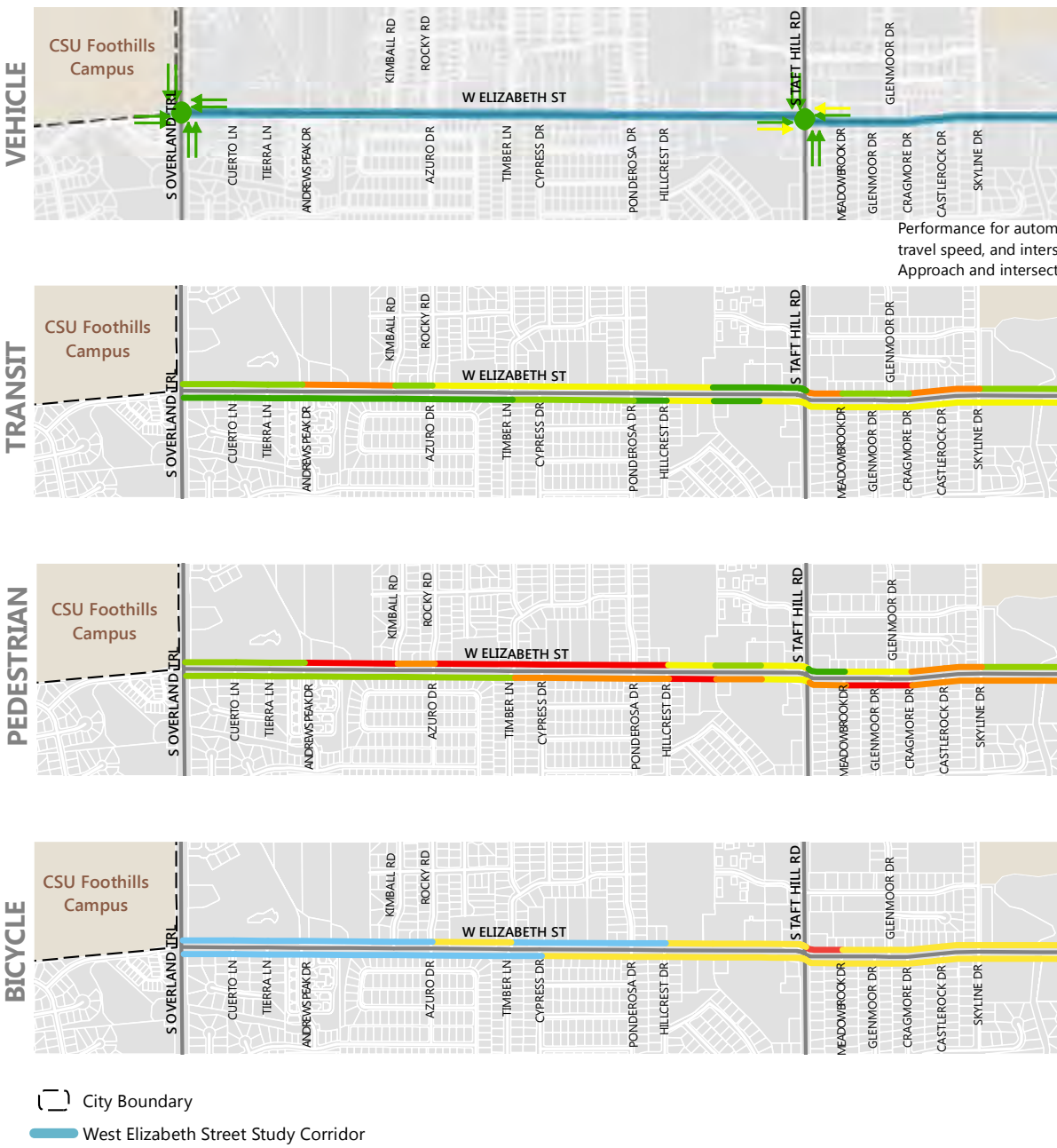
In addition to the multimodal level of service analysis, this report's safety analysis reveals some intersections and segments on the corridor with more crashes than expected, including the intersections of West Elizabeth Street/Shields Street and West Elizabeth Street/Overland Trail. Finally, person-mobility analysis on the corridor reveals that not all intersection users incur the same levels of delay.

Future steps of the West Elizabeth Enhanced Travel Corridor Plan development process will build upon the findings of this Corridor Understanding Report: developing the purpose and need statement and corridor vision, developing alternative improvement scenarios, analyzing alternative improvement scenarios, and selecting and developing a preferred alternative.


WHICH
Pizza
Available


31

FIGURE 45: West Elizabeth Street Multimodal Level of Service



Performance for autom
travel speed, and inters
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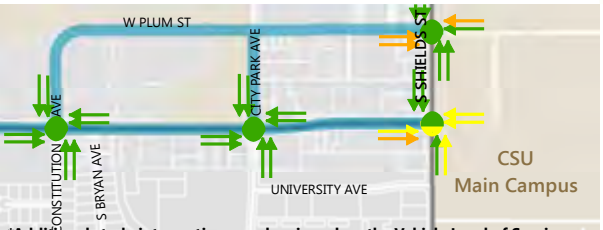
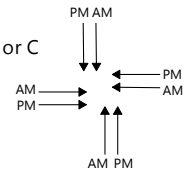


***Additional study intersections can be viewed on the Vehicle Level of Service map**

obiles is based on approach level of service (LOS), which accounts for vehicle section level of service (LOS), which accounts for vehicle delay at intersections. tion LOS are based on 2035 traffic volumes and HCM 2000 methodologies.

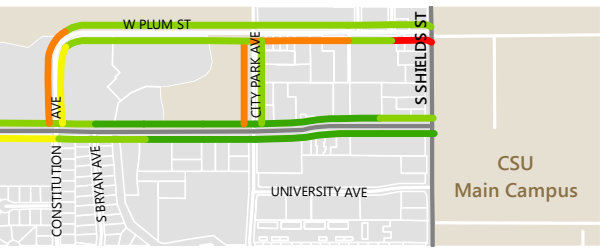
Approach LOS

- LOS A, B, or C
- LOS D
- LOS E
- LOS F



Intersection LOS

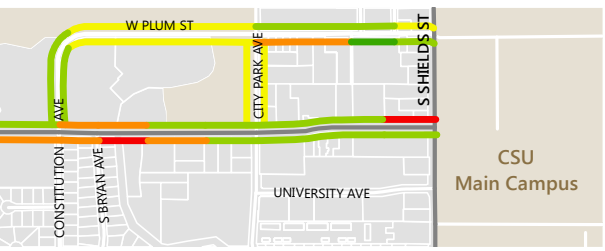
- LOS A, B, or C
- LOS D
- LOS E
- LOS F



Transit LOS

- 4 (Low)
- 5
- 6 (Medium)
- 7
- 8 - 9 (High)

The transit score is based on transit reliability (roadway LOS) and built environment factors including proximate walkways and bikeways and bus stop amenities.



Pedestrian LOS

- 2 - 4 (Low)
- 5 - 7
- 8 - 9 (Medium)
- 10 - 12
- 13 - 15 (High)

The pedestrian score is based on sidewalk width, buffer width and distance to the nearest crossing.

Bicycle LTS

- 2
- 3
- 5

LTS applies the same methodology that is used in the 2014 Bicycle Master Plan. The score from 1-5 represents the level of bicyclist comfort based on traffic volume, speed, number of lanes, and presence and quality of the bikeway.