

appendix: A
VISION, PURPOSE & NEED

West Elizabeth Enhanced Travel Corridor Vision, Purpose and Need

**Prepared for:
City of Fort Collins**

November 24, 2015

DN15-0488

West Elizabeth  **Enhanced Travel
Corridor Plan**

FEHR  PEERS

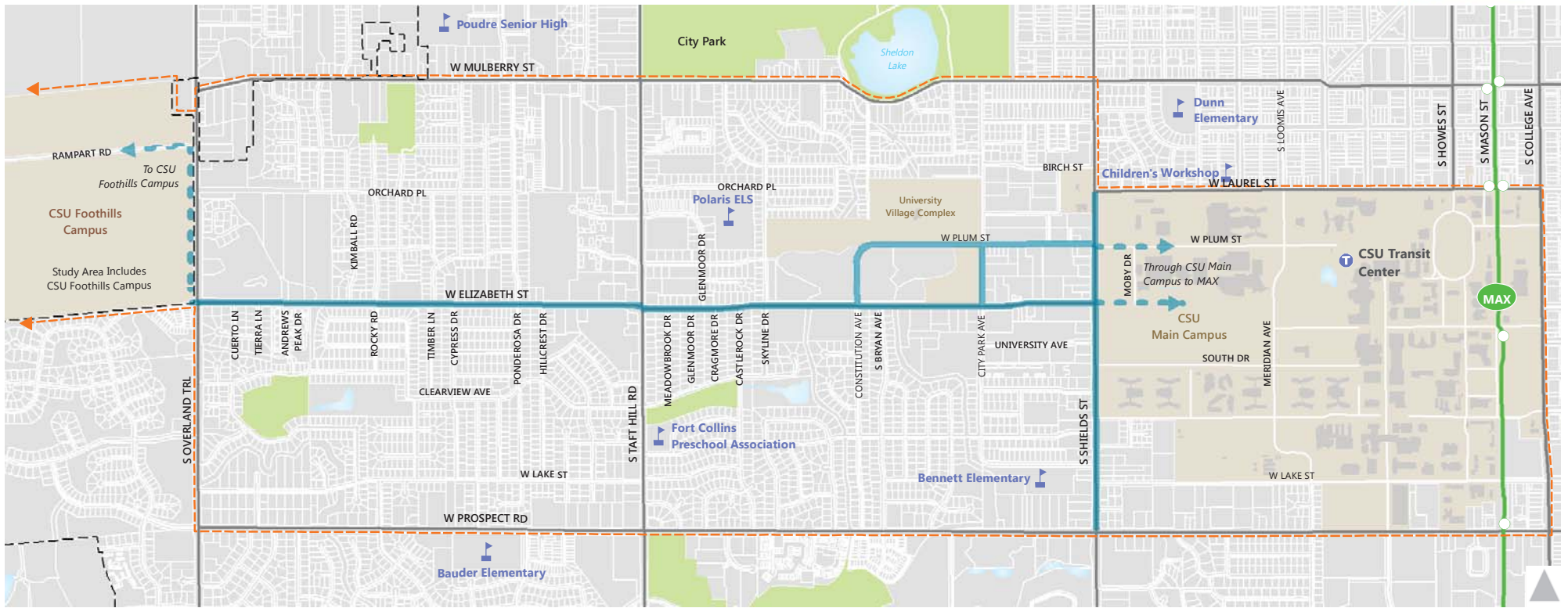
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1. INTRODUCTION

The West Elizabeth Street corridor has been identified in the Transportation Master Plan (TMP) as part of a citywide network of Enhanced Travel Corridors (ETCs) – uniquely designed corridors with an emphasis on high-frequency transit, bicycling and walking. ETCs are intended to support high-quality economic development opportunities for mixed-use, transit-oriented development and support Fort Collins’ active lifestyles and environmental stewardship goals. The West Elizabeth ETC Plan will develop a short- and long-term vision for the corridor based on an understanding of the transportation, land use, environmental, economic and social needs of the area.

The corridor plan focuses on West Elizabeth Street from Overland Trail to Shields Street, with an emphasis on connectivity to CSU's Foothills Campus on the west, and CSU's Main Campus (including MAX stations) on the east, as shown in **Figure 1**. In addition to West Elizabeth Street itself, adjacent corridors are also considered as key to the overall study area’s transportation network: Constitution Avenue (north of West Elizabeth Street), Plum Street (between Constitution Avenue and Shields Street), City Park Avenue (between West Elizabeth Street and Plum Street) and Shields Street (between Prospect Road and Laurel Street). An initial analysis of Shields Street was conducted as part of the West Central Area Plan (WCAP), and this corridor is undergoing additional analysis as a part of the West Elizabeth ETC Plan given its nexus to issues identified through this plan. To a lesser extent, other adjacent streets will be considered—for example, related to cut-through traffic and/or their role in the Low-Stress Bike Network proposed in the Bicycle Master Plan. The Study Area Map (**Figure 1**) represents the project’s focuses.



-  MAX Stations
-  MAX Bus Rapid Transit (BRT)
-  West Elizabeth Street Study Corridor
-  Study Area
-  City Boundary



2. VISION

The vision for the West Elizabeth Enhanced Travel Corridor is to be an easily accessible and reliable multimodal corridor with an emphasis on connectivity to CSU's Foothills Campus on the west and CSU's Main Campus (including MAX stations) on the east. The corridor will be well-integrated and well-connected within the city, with a focus on improving transit, walking and biking. The corridor will foster existing business and future infill and redevelopment to accommodate the growing number and diversity of users in the corridor, which include: students, families and seniors. The network shall:

- **Be unique and adaptable** to the distinctive characteristics of each corridor segment.
- **Be safe and comfortable** for all users.
- **Encourage and prioritize public transportation** and active transportation options.
- **Support the interconnectivity** of all modes.
- **Be a beautiful and vibrant** environment.

3. PURPOSE AND NEED

3.1 INTRODUCTION

The purpose and need statement identifies the goals and needs for the West Elizabeth Enhanced Travel Corridor (ETC) study area. The project is needed because of the current deficiencies in the multimodal transportation system on the corridor. These deficiencies include: inadequate transit service; incomplete, non-ADA compliant (Americans with Disabilities Act, 1990) pedestrian facilities; incomplete, low-comfort bikeways, vehicular safety concerns, and conflicts between pedestrians, bicyclists, and vehicles at access points—all resulting in potential safety issues for users in the corridor. The current deficiencies also present challenges in serving the anticipated growth in population, employment, student enrollment and travel demand in the study area.

3.2 PROJECT PURPOSE

The purpose of the West Elizabeth Street Enhanced Travel Corridor Plan is to develop a corridor plan that will serve existing and future transportation demands, with a focus on multimodal transportation improvements. Anticipated growth is expected through infill projects (development of vacant or under-used land parcels within existing urban areas) and redevelopment with increased density within and around the study area, thereby increasing travel demand. The goal of this ETC Plan is to address the growing demand for transportation options by increasing and improving transit, bicycling and walking infrastructure. Improvements shall provide users with highly efficient, reliable and frequent transit service as well as walking, bicycling, and driving options that are safe, comfortable, efficient and well-marked. Improvements will foster economic vitality through high-quality and attractive facilities, while remaining committed to the City's long-term fiscal responsibility. Specifically, the purpose is to:

- **Increase transit capacity, reliability, and improve transit stop amenities** to accommodate current demand and future growth in population, student enrollment, and travel demand.
- **Improve transit system connectivity** to and from West Elizabeth Street, Colorado State University's Main and Foothills Campuses, and other Transfort routes including MAX.
- **Improve pedestrian facilities for comfort, safety, and accessibility** throughout the corridor.
- **Improve bicycling facilities for ease, comfort, and safety** and to attract new riders.
- **Maintain vehicular mobility, improve safety and enhance access** to commercial properties in the corridor.
- **Support the interconnectivity** between travel modes.

3.3 STATEMENT OF PROJECT NEED

The West Elizabeth Enhanced Travel Corridor Plan shall address the following needs that have been identified throughout the corridor:

- **Inability to support existing travel demands and anticipated growth**, which will exacerbate existing deficiencies in transit service, pedestrian facilities, bicycle facilities, and vehicle safety.
- **Inadequate transit service** due primarily to insufficient system connectivity, low and inconsistent route frequencies, poor reliability, lack of capacity to serve current and future demands, and lack of patron stop amenities.
- **Uncomfortable and incomplete pedestrian facilities and safety concerns** due to inconsistent and missing sidewalks, as well as sidewalks that are not ADA-compliant; in addition, there are limited north/south crossing opportunities, and pedestrians experience significant delays crossing West Elizabeth Street.
- **Uncomfortable and inconsistent bicycle facilities and safety concerns** due to incomplete bike lanes and inadequate intersection treatments. There is also higher than expected rate of bicycle- and vehicle-related crashes in several locations.
- **Vehicular mobility, safety, and access concerns** exist due to intersection and driveway turning conflicts, as well as queue spillback (traffic backed up at a left-hand turn lane, for example) at some signalized intersections.
- **Challenge connecting between modes for trips in the corridor** including inadequate pedestrian and bicycle facilities to and at transit stops and parking challenges in the corridor.

3.3.1 SUPPORT EXISTING TRAVEL DEMANDS AND ANTICIPATED GROWTH

Study area growth in population, employment, and CSU student enrollment will increase demand for travel. Without a transformation of the corridor, future travel demand in the study area will most likely mirror the study area's existing mode share. This will further stress the study area's existing transit service, walkways, and bikeways. Additionally, a lack of transformation will result in high growth rates for vehicle travel. Without improvements to transit service, walkways and bikeways the North Front Range Regional Travel Model projects the following growth rates in vehicle travel 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

The 2040 forecast generally assumes 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.

3.3.2 INADEQUATE TRANSIT SERVICE

System Connectivity

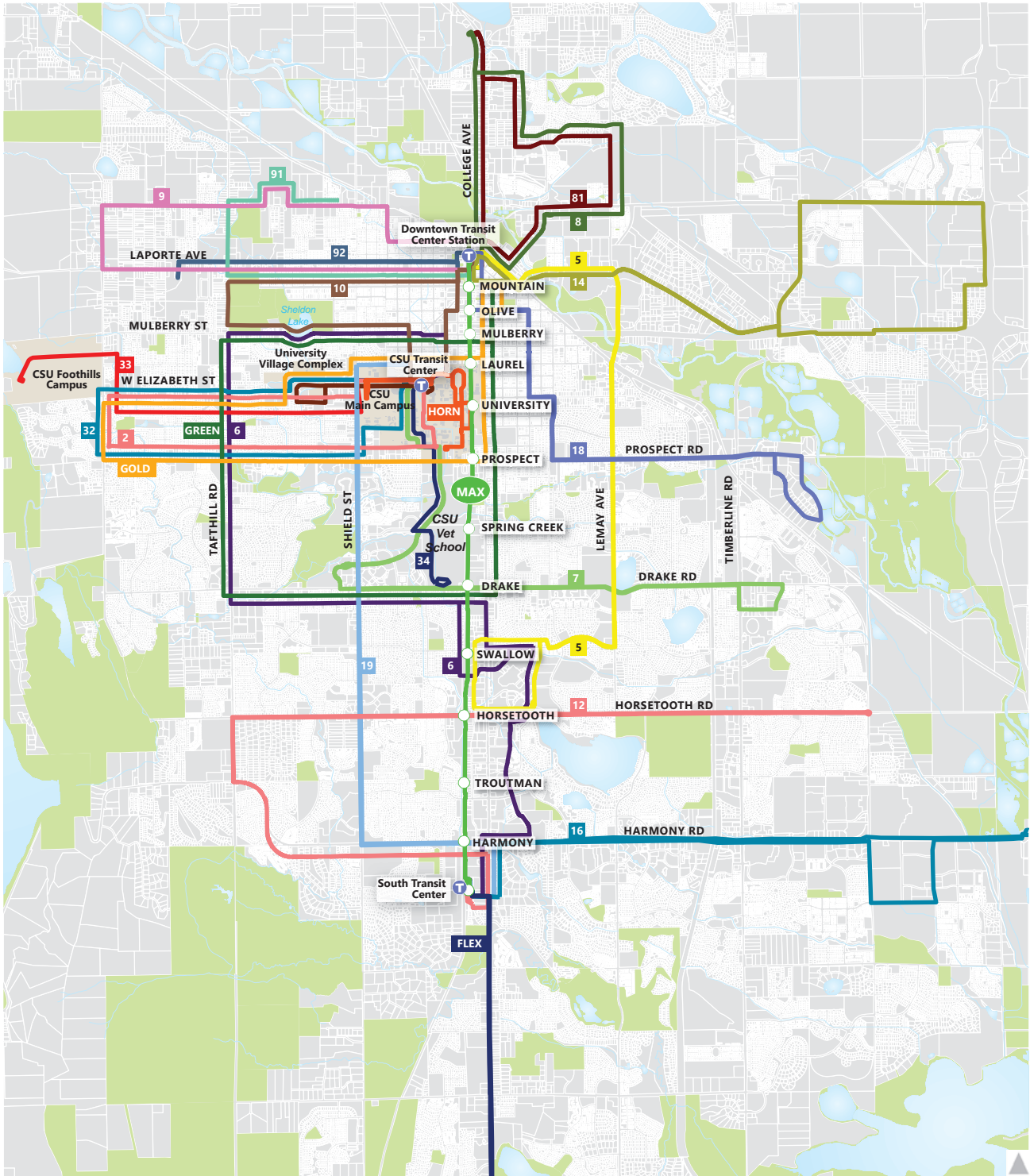
Transfort has designed a hybrid grid/hub-and-spoke network, as shown in **Figure 2**. This service structure is typically utilized in areas with lower service frequencies. It allows passengers to transfer between routes at hub locations, often via timed transfers while still maintaining a grid configuration where strong mixed-use corridors are present. Because of this network configuration, there is a lack of connectivity between routes in the study area and the rest of the system. It takes at least one transfer to reach most major destinations from the study area, with the exception of Colorado State University. More transfers and increased travel time deter both existing and new ridership.

Low and Inconsistent Frequencies




Service frequency is the most important factor in recruiting and attracting new transit ridership. The table below shows the distribution of frequency (10, 30 and 60 minutes) of the nine routes in the study area (Transfort Routes 2, 6, 10, 19, 31, 32, 33, HORN and MAX). During the Peak and Midday time periods, only three of the nine routes run every ten minutes (MAX, HORN, and 31). During the summer (when CSU is not in session), only one route operates at ten-minute frequencies (MAX) and the remainder of the routes run every 30 or 60 minutes or are not in service. Frequency and service is reduced even further on evenings, weekends and during the summer. This means that the majority of routes do not run frequently enough to allow for “spontaneous use” during peak, midday periods or when CSU is not in session. The current frequencies require users to check the schedule before arriving at the bus stop, making transit less convenient.

Table 1: Frequency of Transfort Routes

Frequency (minutes)	Number of Routes		
	Peak (AM/PM)	Midday	CSU not in Session
10	3	3	1
30	4	3	2
60	2	3	3
Does not run	--	--	3



Data shown is as of Spring 2015

-  MAX Stations
-  Bus Route
-  MAX Bus Rapid Transit (BRT)



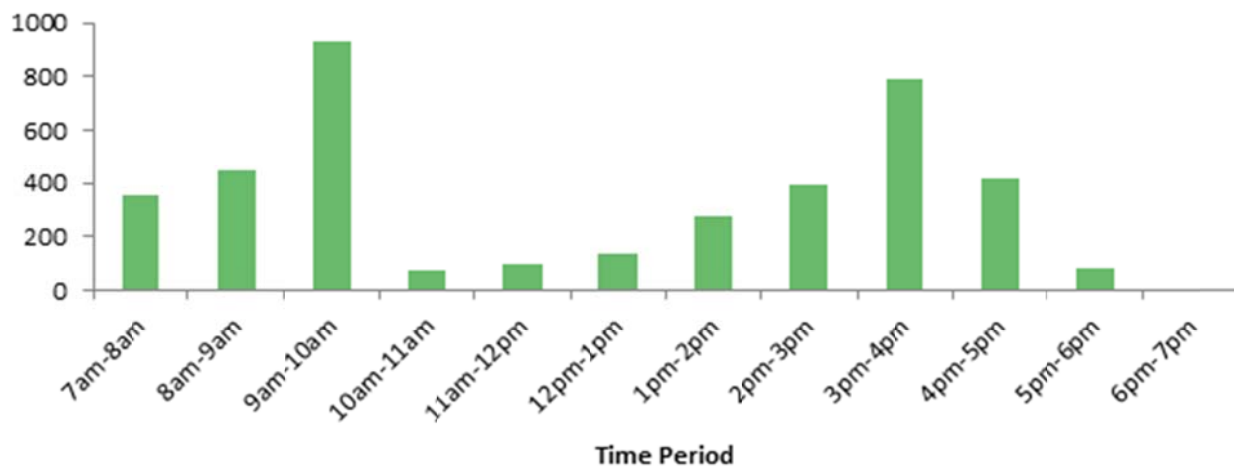
Poor Reliability

The nine Transfort routes that travel within the study area range in their level of 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 schedule. Based on this standard, 85 percent of trips in the West Elizabeth Corridor study area are on-time, 14 percent are late, and 1 percent of trips are early. Within the study area, on-time performance ranges from a high of 98 percent for the HORN and Route 31 to a low of 72 percent for Route 2. This range and high upper limit is an indicator of inadequate reliability of the routes running within the study area. Reliability of service is important to maintain existing riders and recruit new riders.

Lack of Capacity to Serve Existing and Future Demand

Transfort Route 31 currently presents a challenge with passengers not being accommodated – meaning passengers who are unable to board the arriving bus and must wait for the next due to high ridership volumes and lack of service capacity. The hindrance is concentrated along Plum Street just west of the CSU Main Campus in the mornings and at the CSU Transit Center (CTC) during the afternoon. In an attempt to address this issue during the periods of highest demand, Transfort has supplemented Route 31 with additional buses that are not otherwise part of the regular schedule. Without additional transit vehicle capacity and/or frequencies the potential for overcrowding and passengers not accommodated will increase, especially as the area continues to develop/redevelop and more student-oriented housing is built. **Figure 3** shows the number of passengers left behind by all routes in the study area between January and April 2015 by time period.

Figure 3: Passengers Left Behind by Time Period



Note: Passenger leave behind data covers January to April 2015

Lack of Patron Stop Amenities and Access to Stops

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 to 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 or enhanced crossings. Bike lanes are also inconsistent with a lack of end of trip bike facilities such as bike parking.

3.3.3 UNCOMFORTABLE AND INCOMPLETE PEDESTRIAN FACILITIES AND SAFETY CONCERNS

The sidewalks in the study area are inconsistent in width, incomplete in many sections, and generally non-compliant with ADA standards and requirements. Other pedestrian amenity deficiencies include lack of crossing opportunities and/or significant delay for pedestrians crossing in many locations in the study area. Together these deficiencies create an uncomfortable environment for pedestrians and encourage unsafe behavior, such as crossing at unmarked locations. **Figure 4** shows the level of safety and comfort for pedestrians within the study area, based on sidewalk width, buffer width, and difficulty in midblock crossing.

Safety Concerns

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.

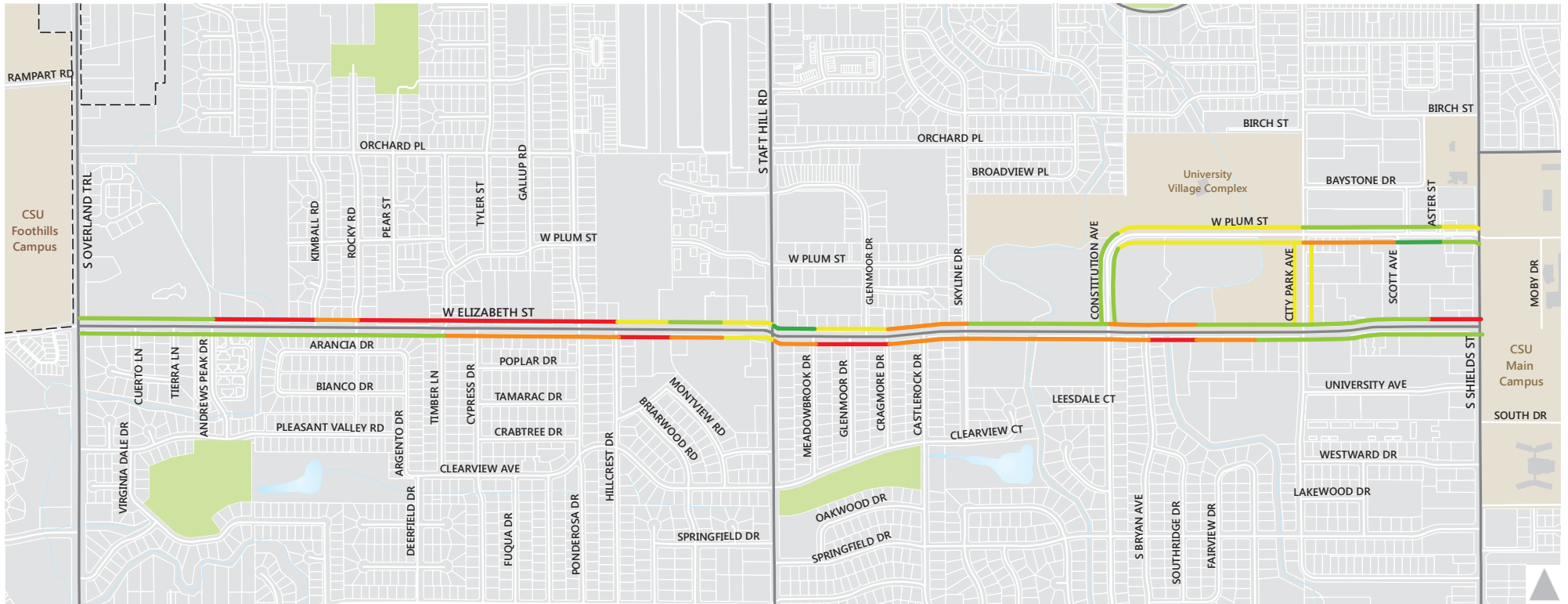
Uncomfortable, Incomplete and ADA Non-Compliant

On West Elizabeth Street, several blocks west of Taft Hill Road and one block west of Shields Street sidewalks are missing completely. In the segment west of Constitution Avenue, current sidewalk infrastructure is generally below the four foot (48 inches) minimum width required to be ADA compliant. In addition, the majority of sidewalks in the study area do not have tree lawn buffers to provide a space between pedestrians and vehicular traffic. Other challenges for pedestrians include the many driveways throughout the whole corridor, specifically in the Campus West area as well as the western segment of the study area; these driveways sometimes have the sidewalk slant at an uncomfortable angle for walking and for people in mobility devices. The driveways also introduce conflicts for pedestrians with turning vehicles. The overall result is a less comfortable pedestrian experience.

Limited Midblock Crossings and Delay at Crossings

The western mile of the West Elizabeth Street Corridor currently offers no marked north/south pedestrian crossings opportunities, other than the Overland Trail and Taft Hill Road intersections. One crossing is planned to be constructed approximately $\frac{1}{4}$ mile west of Taft Hill Road in Fall 2015; however, that leaves a $\frac{3}{4}$ mile segment of West Elizabeth without a north/south crossing location. At most signalized intersections, the average pedestrian delay is relatively high during both the AM and PM peak hours. Five of the nine intersections in the study area have a delay greater than 45 seconds in the AM peak hour and greater than 50 seconds in the PM peak hour.

Shields Street has a high demand for pedestrian crossings and a perceived low level of comfort. Aside from the Plum Street and West Elizabeth Street intersections, the next marked crossing to the north is 600 feet from Plum Street at Laurel Street and the next marked crossing to the south is 2,000 feet from West Elizabeth Street at Lake Street. Additionally, there are a high number of driveway conflicts in certain areas on Shields Street. As the area west of Shields Street continues to develop at a higher density, and as CSU's master plan is built out, demand for crossing in this area will likely increase.



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

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



Pedestrian Level of Service (LOS)

Figure 4

3.3.4 UNCOMFORTABLE AND INCONSISTENT BICYCLE FACILITIES AND SAFETY CONCERNS

Improving bicycle facilities will address current safety and comfort issues as well as encourage new riders. **Figure 5** shows the Level of Traffic Stress (LTS) for bicyclists within the study area, based on traffic volume, speed, number of lanes and presence and quality of bikeway.

Safety Issues

The intersections of West Elizabeth Street/City Park Avenue and West Elizabeth Street/Ponderosa Drive have more crashes than at similar intersections. In addition, there are more crashes along West Elizabeth Street than at similar segments. There are also a high number of driveway conflicts for bicyclists in certain sections of West Elizabeth Street, particularly near King Soopers and in the Campus West area.

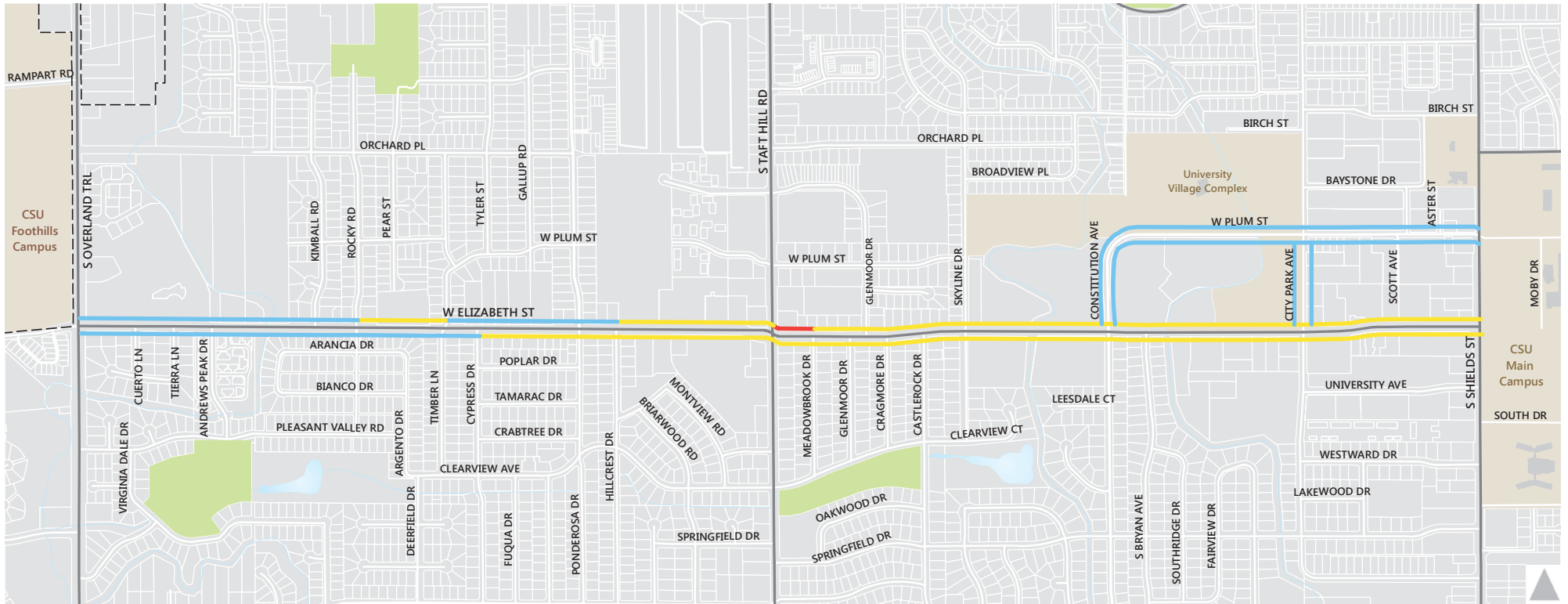
Inconsistent Bike Lanes

Bicycle facilities within the study area are inconsistent in width, type and existence in some locations. Along West Elizabeth Street, bike lanes range from five feet to seven feet in width and are absent from certain segments. The inconsistencies in bicycle facilities can lead to a perceived low level of comfort for bicyclists. Bike lanes on Shields Street within the study area have similarly been identified as having a low level of comfort.

Inadequate Intersection Treatments

There are inadequate intersection treatments for bicyclists at several of the signalized intersections, both at the approach to a number of intersections as well as through the intersection. For example, the intersection of West Elizabeth Street/Shields Street has the largest number of bicyclists in the peak hour but does not have intersection treatments to assist with bicyclist turning movements. In addition, average bicyclist delay at three intersections in the study area in both the AM and PM peak hour is greater than 30 seconds, LOS (Level of Service) D or E. The highest 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. These inadequate intersection treatments and delays encourage risky bicycling behavior contributing to the safety issues observed in the corridor.

In addition there is demand for crossing opportunities at several un-signalized locations, resulting in cyclists engaging in risky travel behavior. This is most prevalent at Shields Street between Lake Street and West Elizabeth Street where cyclists often attempt crossing traffic in a two-step process using the center turn lane as a refuge.



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.



Bicycle Level of Traffic Stress (LTS)

Figure 5

3.3.5 VEHICULAR MOBILITY, SAFETY AND ACCESS CONCERNS

A traffic and safety analysis identifies the current challenges related to vehicles in the corridor.

Safety Issues

There are higher than expected numbers of crashes at two intersections and three of the seven segments within the study area. The intersection with the highest 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. A heat map of all crash types in the study area is shown **Figure 6**.

Intersection and Driveway Turning Conflicts (Access)

There are more than 20 access points, including driveways and intersections, along West Elizabeth Street between Shields Street and Constitution Avenue and more than 10 access points in the quarter mile west of Taft Hill Road, thereby creating a number of conflicts with vehicles turning in or out of driveways, resulting in a history of crashes along these segments and confusion and frustration for road users.

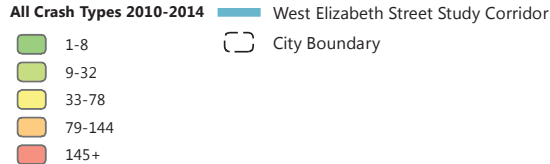
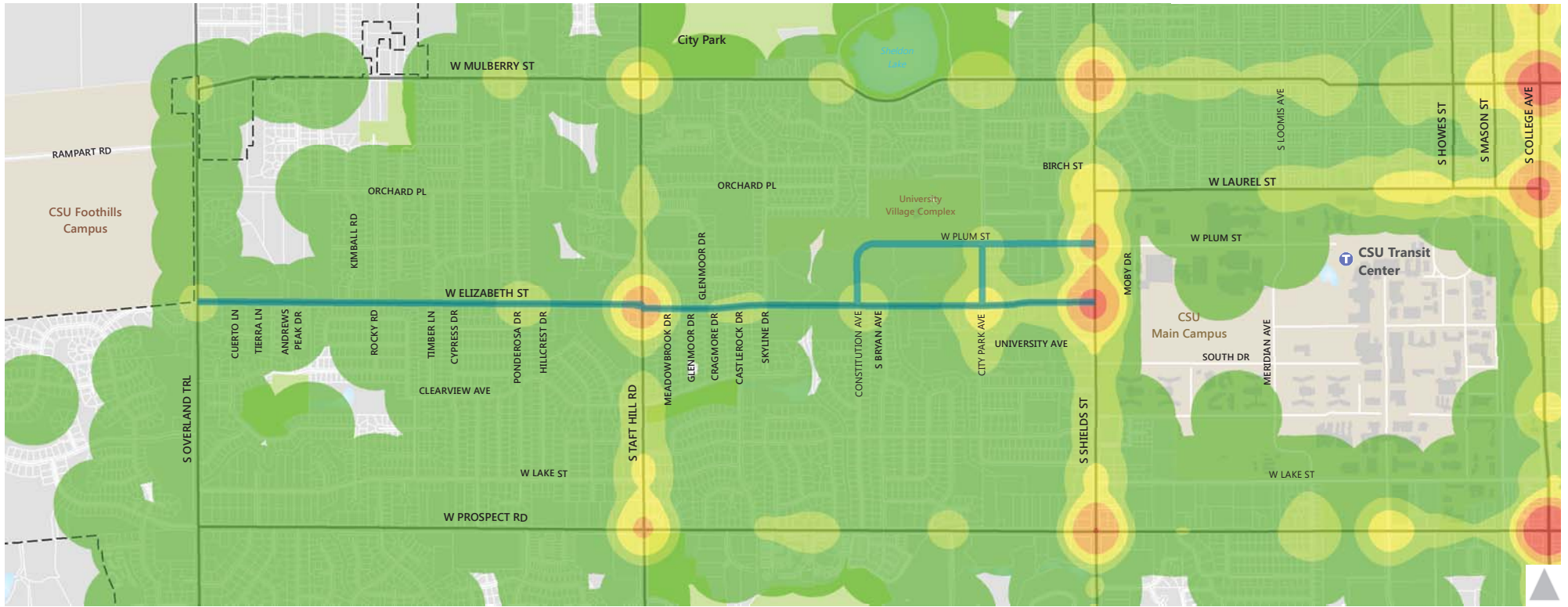
Queue Spillback at Signalized Intersections

Vehicular issues are resulting from the spillback of vehicles at signalized intersections, and in some cases is exacerbated by a low intersection level of service (LOS) and high approach delay. Of specific concern are movements where queued traffic spills back into moving travel lanes. The northbound left-turn at the West Elizabeth Street/Shields Street intersection has been identified by the public and stakeholders for its queue spillback issues; this movement currently operates at LOS F during the PM peak hour.

Safety issues resulting from turn conflicts and queue spillback at intersections will increase in the future if countermeasures to these issues are not developed. Additionally, high growth rates in vehicle travel resulting from a lack of improvements to transit service, walkways and bikeways may exacerbate these safety issues.

Alternative Routes/Cut-Through Traffic

Due to congestion and delay at several intersections in the study area, vehicles are finding alternative, more efficient routes. Common alternative routes include City Park Avenue and University Avenue. This rerouting has potentially negative implications for surrounding neighborhoods and adjacent corridors including speeding, additional traffic and congestion.



Source: City of Fort Collins, 2014



All Crash Types - 2010 - 2014

Figure 6

3.3.6 LACK OF CONNECTIVITY BETWEEN MODES

There is a lack of interconnectivity between modes in the West Elizabeth Corridor. This is often referred to as the first-mile/last-mile problem, which describes the lack of facilities and accessibility between transit stops and origins and destinations. The bus stops in the study area have very few patron amenities and lack end of trip facilities such as bike parking. When coupled with low onboard bicycle accommodations this inhibits one's ability to make connections between modes for trips. Furthermore, there is a need to make bus stops more accessible via the pedestrian and bicycle networks which is an important component of making riding transit safer, more accessible and comfortable. In general accessing stops can be challenging as they are not always located near signalized and enhanced midblock marked crossings. In addition, informal vehicle park-n-ride locations in neighborhoods have been observed in some areas on the corridor indicating a need for drivers to connect to transit; with increasing parking rates on CSU's campuses and additional transit service, this phenomenon is likely to exacerbate in the future.