East William Complete Streets Feasibility Study

Prepared for:

Carson Area Metropolitan Planning Organization (CAMPO)

Carson City Public Works

3505 Butti Way

Carson City, NV 89701

Carson Area Metropolitan Planning Organization
CAMPO

In collaboration with:

CARSON CITY PUBLIC WORKS

NEVADA DOT SAFE AND CONNECTED

Taylor Made SOLUTIONS

Michael Baker INTERNATIONAL

NCE

WOOD RODGERS

Acknowledgements

The Carson Area Metropolitan Planning Organization (CAMPO) and Carson City Public Works employees and partners were instrumental in the development, review, and refinement of the East William Street Complete Streets Feasibility Study. CAMPO, Carson City Public Works, and the entire consultant team would like to express their appreciation to the supporting staff and partners for their participation and contributions.

CAMPO and Carson City Public Works

Darren Anderson, PE (Project Manager)
Randall Rice, PE (City Engineer)
Marquis Williams (Transportation Planner)
Kelly Norman, AICP (Transportation Planner)
Christopher Martinovich, PE (Transportation Manager)

Consultant Team

Kathleen Taylor, Taylor Made Solutions
Bryan Gant, Wood Rodgers
Mario Tambellini, Wood Rodgers
Angela Hueftle, NCE
Sean Teeter, NCE
Jeremy Hall, NCE

Executive Summary

Project Purpose and Summary

The East William Street Complete Streets Feasibility Study (Study) identifies, evaluates, and recommends potential multimodal (vehicular, transit, pedestrian, and bicycle) transportation improvements along East William Street between North Carson Street and Interstate 580 to improve safety for all users of the corridor. The results of this study will be used to inform the design and construction of the Complete Streets corridor.

The existing corridor, which serves approximately 20,100 vehicles per day (AADT) provides access to local and regional employment opportunities as well as numerous goods and services. In its current form, the corridor is a deteriorated former U.S. Highway (Highway 50) in need of safety, accessibility, and rehabilitation improvements.

In 2009, with the extension of Interstate 580, the Nevada Department of Transportation (NDOT) relinquished the roadway and maintenance responsibilities to Carson City. The existing conditions along the corridor vary, from missing or severely deteriorated infrastructure to new infrastructure that has been constructed by local private investment in a piecemeal approach.

East William Street has diverse functions and has been divided into three parts for the purposes of this Study: 1) the western-most segment between North Carson Street and Roop Street; 2) the middle part between Roop Street and Saliman Road; and 3) the eastern-most segment between Saliman Road and I-580. These three distinct areas have unique challenges and require different approaches to the development of recommendations.

Project Benefit and Goals

Carson City (City) is researching more productive uses that; facilitate comfortable, convenient, and safe travel for pedestrians and cyclists; increase driver safety; improve vehicular access to abutting businesses; spur private investment in this important and vibrant commercial corridor; and prepare Carson City for future Smart City advancements. The Project goals include:

- Review the number of travel lanes due to reduced traffic in the corridor.
- Improve safety for pedestrians, cyclists and automobiles.
- Improve accessibility for disabled persons along the corridor.
- Support land use plans and economic development.
- Increase multimodal travel capacity to accommodate growing population and employment.
- Improve utility infrastructure to alleviate flooding and maintain reliable water and sewer services to citizens and businesses.

Public Participation

Early, effective, and continuous public participation and engagement were essential to the Study. A Public Involvement Plan was developed to guide the public participation, engagement, and visioning process from the Study through the design phase of the Project.

An initial stakeholder canvassing outreach introduced the Project to corridor stakeholders in January 2022. Project descriptions and a list of frequently asked questions were distributed at this event and available through the updated East William Complete Streets Project (Project) website on **CarsonProud.com**. 229 surveys were completed to provide input on safety, traffic, beautification and bicycle and pedestrian improvements. 120 georeferenced comments focused on pedestrian, bicyclist, roadway, traffic/ transit, park/ landscaping, and stormwater/ flooding were made through an interactive Project Webmap. Multiple community events were organized to engage corridor stakeholders and solicit input for the Project. In partnership with Carson High School, a Project logo was chosen from 23 entries from high school graphic design students.

Project Design Alternatives

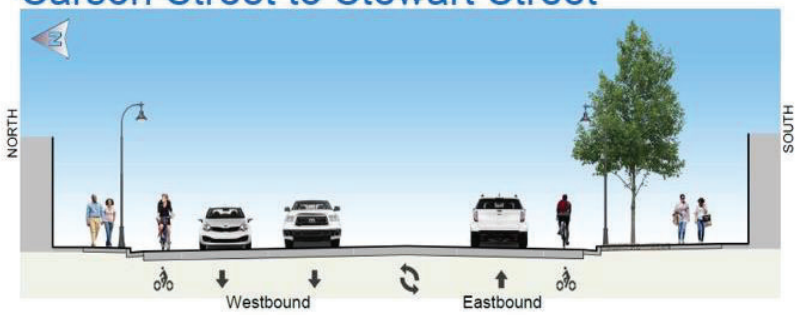
Technical Studies were performed to evaluate the conditions of the corridor and form the basis for the Project design alternatives. These studies included a Traffic Analysis, an environmental review, and various other design specific reports.

Several alternatives were developed for the different segments of the corridor to address the issues noted in the technical studies and through the public outreach effort to reflect Project goals. The alternatives were then evaluated using criteria such as traffic operations, cost, sustainability, and user experience. A preferred alternative was then selected and presented to CAMPO Staff and the Carson City Regional Transportation Commission (RTC).

The preferred alternative, shown in Figure A, is consistent with the Study's goals as well as the goals of the City's Complete Streets Policy. This alternative will provide solutions to many of the identified issues in the corridor and will lead to improved safety for all users including motorists, pedestrians, cyclists, and transit users regardless of their age or ability.

Following completion and adoption of this Study, the Project will be transitioned to Carson City Public Works who will incorporate the results and recommendations presented to initiate the formal environmental and designs processes.

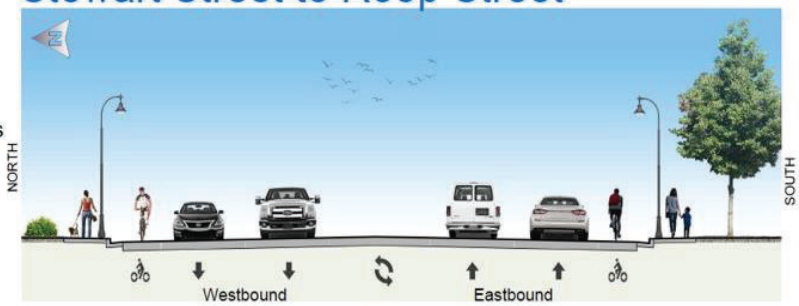
Carson Street to Stewart Street



- Trees and Bushes
- Enhanced Street Lighting
- Utility and Stormwater Improvements
- Furnishings
- Removal of One Eastbound Travel Lane
- Narrower Travel Lanes
- Dedicated Bicycle Lanes

Stewart Street to Roop Street

- Existing Landscaping to Remain
- Enhanced Street Lighting
- Utility and Stormwater Improvements
- Furnishings
- Narrower Travel Lanes
- Dedicated Bicycle Lanes



Roop Street to Saliman Road

- Trees and Bushes
- Enhanced Street Lighting
- Utility and Stormwater Improvements
- Intersection Improvements
- Additional Parking at Mills Park
- Additional Crosswalk Near Mills Park
- Sidewalk Connectivity
- Wide Sidewalks
- Narrower Travel Lanes
- Buffered Bicycle Lanes
- Electric Vehicle Charging Stations
- Improved Multi-use Path

- Trees and Bushes
- Enhanced Street Lighting
- Utility and Stormwater Improvements
- Intersection Improvements
- Access Improvements
- Increased Turn Lane Lengths
- Improved Sight Distance
- Shortened Pedestrian Crosswalks
- Narrower Travel Lanes
- Sidewalk Connectivity
- Buffered Bicycle Lanes
- Existing Multi-use Path to Remain

Saliman Road to Gold Dust West Way

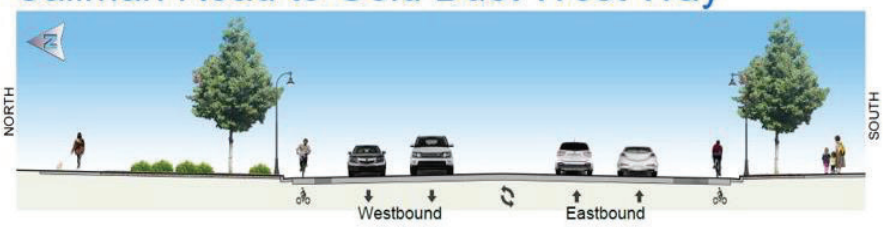


Figure 1-East William Street Complete Street Project Preferred Alternative

Table of Contents

Acknowledgements 2
CAMPO and Carson City Public Works 2
Consultant Team 2
Executive Summary 3
Project Purpose and Summary 3
Project Benefit and Goals 3
Public Participation 4
Project Design Alternatives 4
Table of Contents 6
Attachments 8
Project Map 9
1.0 Introduction 10
Setting 10
Corridor Study Limits 10
Corridor Study Goals 11
2.0 Existing Conditions 12
Supporting Regional Studies, Documents, and Plans 12
Existing Traffic Volumes and Lane Configuration 12
Existing Traffic Volumes 12
2022 Intersection Operations Analysis 13
Safety 15
Crash Data 15
Crash Trends by Intersection 16
Pedestrian and Bicycle Facilities 18
Sidewalks 18
Bicycle Facilities 19
ADA Issues 19
Transit Analysis 19
Geotechnical and Pavement Investigations 20
Drainage Analysis 20

Overall Existing Feel of the Corridor 20
3.0 Corridor Analysis 22
Future Traffic Volumes and Level of Service 22
Future Segment Analysis 22
Future Intersection Operations Analysis 22
Traffic Signal Communications and Interconnect 25
Environmental Implications 25
Hazardous Material 26
Section 4(f) 26
Right of Way, Access, and Utilities 27
Future Transit Routes 28
4.0 Public Outreach Efforts and Initiatives 28
East William Complete Street Survey 29
East William Complete Streets Interactive Comment Map 31
Public Meeting and Regional Transportation Commission (RTC) Meeting 31
5.0 Design Alternative Development 32
Preferred Alternative 33
Theme and Neighborhood Character 35
6.0 Moving Forward – Next Steps – Planned Outreach Opportunities 37

Attachments

Attachment A: Greening America's Capital Study

Attachment B: East William Street Traffic Data Collection and Analysis Traffic Report

Attachment C: Design Alternatives Report

Attachment D: East William Street Environmental Technical Memos

Attachment E: Public Involvement Plan

Project Map

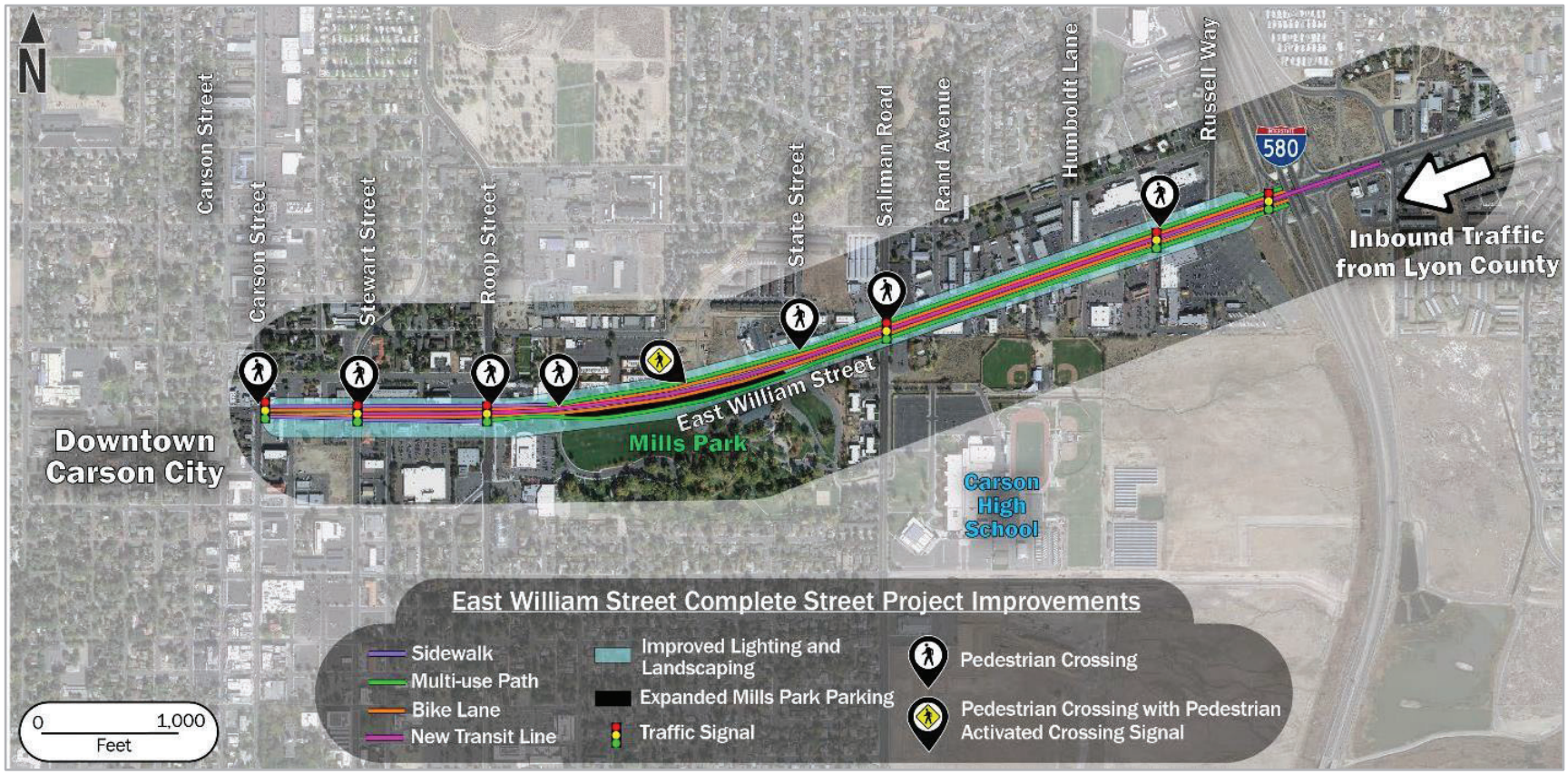


Figure 2- East William Street Complete Street Project Improvements Map

1.0 Introduction

The Carson Area Metropolitan Planning Organization (CAMPO) initiated the East William Street Complete Streets Feasibility Study (Study) to identify and evaluate potential multimodal (automobile, pedestrian, bicycle, and transit) transportation improvements along the East William Street Corridor. Focus areas for improvements for the East William Complete Streets Project (Project) include safety of all transportation modes, infrastructure for alternative modes, efficiency of traffic operations, facilities for people with disabilities, and integration with land-use plans. The overall objective is to identify strategies for developing street improvements for all users.

In 2014, Carson City (City) was awarded the Greening America's Capitals Grant. The resulting Greening America's Capitals Study (Attachment A), produced in cooperation with the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (U.S. DOT), established a community-driven vision for the Project. The 2014 Greening America's Capitals Study paved the way for this Study, which explores the more technical aspects of Project design and development including traffic volumes, right of way, and landscaping.

This Study addresses challenges and will direct the Project team on opportunities and solutions that will encourage economic development and improve livability along the corridor.

Setting

The Project is within Carson City, Nevada, in Sections 9 and 17 of Township 15 North, Range 20 East of the Mount Diablo Principal Meridian. Carson City has a population of 55,244 as of the 2020 Census and a density of 378 people per square mile. The Carson Area Metropolitan Planning Area has a regional population of approximately 85,000. East William Street provides essential connections for both internal and external travelers. The street serves as one of the two main commercial corridors in the City. Additionally, Interstate 580 (which serves about 38,500 vehicles per day) and U.S. Route 50 (which serves about 29,600 vehicles per day) both feed into East William Street.

Corridor Study Limits

The focus of this Study is East William Street between North Carson Street and Interstate 580, approximately 1.5 miles in length. East William Street is classified as a minor arterial. To develop and analyze alternatives, the corridor was divided into three distinct segments correlating with surrounding land issues. These segments can be viewed in the Project Map on Page 9. The western segment is more urban in nature. It begins at the intersection of East William Street and North Carson Street and runs east to Roop Street. The middle segment, between Roop Street and Saliman Road is characterized mainly by Mills Park and the Community Center. The eastern segment, between Saliman Road and

I-580, serves both as a commercial corridor with shops and restaurants, and as a gateway to the City from neighboring Washoe, Douglas, and Lyon Counties.

Corridor Study Goals

Stakeholder and community-driven goals for the corridor guided the development of improvement alternatives. These goals were collected largely as part of the Greening America's Capitals Study in 2014. The following table shows the local vision for the Project Corridor:

Table 1: East William Street Corridor Community Vision

Improve pedestrian facilities and crossings at key intersections
Increase bicycle comfort and safety
Improve vehicle circulation and reduce traffic speeds to safer levels
Create a sense of place and unique character
Establish a gateway to downtown Carson City from I-580.
Incorporate innovative green infrastructure techniques along the corridor

2.0 Existing Conditions

The CAMPO team worked with several consultants to produce multiple reports identifying and analyzing the opportunities and constraints for a Project along the East William Street corridor.

Supporting Regional Studies, Documents, and Plans

- 2050 Regional Transportation Plan
- Carson City Master Plan: Envision Carson City
- Unified Pathways Master Plan
- Greening America's Capitals Plan: Greening East William Street
- 2020 ADA Transition Plan for Pedestrian Facilities in the Public Right of Way
- Title VI Plan for Carson City Regional Transportation Commission (RTC) and Carson Area Metropolitan Planning Organization (CAMPO)
- Jump Around Carson (JAC) Transit Development and Coordinated Human Services Plan
- 2021 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant recipient
- Carson City Safe Routes to School Master Plan
- Carson City Complete Streets Policy
- Pattern and Palette of Place: A Landscape and Aesthetics Master Plan for the Nevada State Highway System

Existing Traffic Volumes and Lane Configuration

A traffic operations analysis study was conducted in March of 2022 along the Project corridor to inform the design and public outreach processes. The report analyzed six intersections within the corridor, five signalized and one unsignalized, including:

- E. William Street/N. Carson Street (signalized)
- E. William Street/Stewart Street (signalized)
- E. William Street/Roop Street (signalized)
- E. William Street/State Street (unsignalized)
- E. William Street/Saliman Road (signalized)
- E. William Street/Gold Dust Way (signalized)

The study included analysis of AM, PM, and Mid-Day peak traffic periods to ensure the range of traffic fluctuations throughout the day are considered. Analysis years include 2022 (existing), as well as 2030 and 2050 future years consistent with CAMPO's Travel Demand Model.

Existing Traffic Volumes

Existing traffic turning movement counts for 2019 (pre-pandemic) were collected at each of the six intersections using the Streetlight Data platform, a "big-data" platform which leverages anonymous data from location-based devices such as cell phones and GPS devices. Based on the results of the seasonal analysis, the following peak seasons and corresponding peak hours were identified for each study intersection as seen in Table 2.

Table 2: Peak Seasons and Hours for Major William Street Cross Streets

Intersection	Peak Season	AM Peak Hour	Mid-Day Peak Hour	PM Peak Hour
Carson St.	April-June	7:15am-8:15am	12:00pm-1:00pm	4:30pm-5:30pm
Stewart St.	April-June	7:00am-8:00am	12:30pm-1:30pm	4:45pm-5:45pm
Roop St.	April-June	7:00am-8:00am	12:00pm-1:00pm	4:30pm-5:30pm
State St.	April-June	7:00am-8:00am	12:00pm-1:00pm	4:30pm-5:30pm
Saliman Rd.	October-December	7:00am-8:00am	1:00pm-2:00pm	4:45pm-5:45pm
Gold Dust Wy.	April-June	7:00am-8:00am	12:15pm-1:15pm	4:30pm-5:30pm

Traffic turning movements for the peak periods above were extracted for 2019 (pre-pandemic) and extrapolated to create 2022 (existing) turning movement counts by applying an average 0.57-percent annual growth rate. This average annual growth rate was obtained by analyzing the CAMPO Travel Demand Model (TDM). Turning movement counts for each intersection are shown in the Traffic Study found in Attachment B.

2022 Intersection Operations Analysis

Based on the existing turning movement counts, existing signal timings, and pedestrian counts, a Level of Service (LOS) analysis was conducted using Synchro 11 software. This software applies *Highway Capacity Manual (6th Edition)* methodology to analyze intersection performance and identify improvements. The LOS thresholds are displayed in Table 3 below.

Table 3: Level of Service Description

LOS	Description	Average Delay (seconds per vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Free flow	<10	<10
B	Stable flow with some effect from other vehicles	10-20	10-15
C	Stable flow with significant effect from other vehicles	20-35	15-25
D	High density traffic conditions still with stable flow	35-55	25-35
E	At or near capacity flows	55-80	35-50
F	Over capacity conditions	>80	>50

Carson City Municipal Code of Ordinances Section 18.12.13 establishes LOS D as the standard. Unique situations and minor movements may exceed this standard upon due care. Using this methodology, the LOS analysis for existing 2022 conditions is shown in Table 4 below.

Table 4: Existing Level of Service

#	Intersection	Control Type	LOS Criteria	Peak Hour	2022 Conditions	
					Delay (S/V)[1]	LOS
1	Carson St & William St	Signal	D	AM	20.8	C
				MD	22.7	C
				PM	25.8	C
2	Stewart St & William St	Signal	D	AM	19.4	B
				MD	25.2	C
				PM	36.3	D
3	Roop St & William St	Signal	D	AM	19.2	B
				MD	22.1	C
				PM	24.7	C
4	State St & William St	Signal	D	AM	25.4	D
				MD	19.2	C
				PM	20.0	C
5	Saliman Rd & William St	Signal	D	AM	39.1	D
				MD	28.4	C
				PM	34.8	C
6	Gold Dust West Way/Commercial Dwy & William St	Signal	D	AM	19.7	D
				MD	29.9	C
				PM	27.2	C

Notes:

[1]"Average" control delays (in seconds/vehicle) are indicated for All-way Stop-Control (AWSC) and Signal controlled intersections. "Worst-movement delay" (in seconds/vehicle) is indicated for One-Way Stop-Controlled (OWSC) and Two-Way Stop-Controlled (TWSC) intersections.

Safety

This section summarizes the crash history along the Project corridor. Crash rates for the study segments were calculated and compared to typical crash rates for similar facilities around the State (when available). This section also explains any trends that emerged from the safety analysis and suggests potential improvements to increase safety for corridor users.

Crash Data

Crash data for the four-year period from January 2016 to January 2019 was obtained from NDOT. The safety analysis evaluated the crash data for each of the three segments separately. Findings are reported below for the following segments.

North Carson Street to Roop Street

Crash data was collected on the segment along East William Street between North Carson Street and Roop Street (approximately 0.3 miles), not including the intersection of East William Street and Roop Street (analyzed as part of the subsequent segment). Within the 4-year study period, there were 60 total crashes with zero fatalities. 49 crashes were

categorized "Property Damage Only," 14 were "Non-Incapacitating/Minor Injury," and 6 were "Incapacitating/Serious Injury."

Roop Street to Saliman Road

The segment of East William Street between the Roop Street intersection and Saliman Road (approximately 0.5 miles) experienced 46 total crashes within the 4-year study period. 33 crashes were categorized "Property Damage Only," 11 were "Non-Incapacitating/Minor Injury," and 2 were "Incapacitating/Serious Injury." Additionally, 1 fatality was reported in Calendar Year 2020[1] along this segment.

Saliman Road to I-580

The segment of East William Street between the Saliman Road intersection and I-580 (approximately 0.5 miles) had the highest number of crashes out of the three analyzed segments. Between 2016 and 2019, there were 109 total crashes with zero fatalities. 73 crashes were categorized "Property Damage Only," 27 were "Non-Incapacitating/Minor Injury," and 9 were "Incapacitating/Serious Injury."

Crash Trends by Intersection

In addition to collecting raw crash data at a segment level, several smaller segments and intersections were analyzed to identify relevant crash trends. These trends were identified as part of Attachment B, and the conclusions are shown in Table 5.

[1] 2020 State of Nevada Crash Data was received by Carson City staff after corridor analyses were performed.

Table 5: Crash Trends by Segment or Intersection Along East William Street (2016-2019)

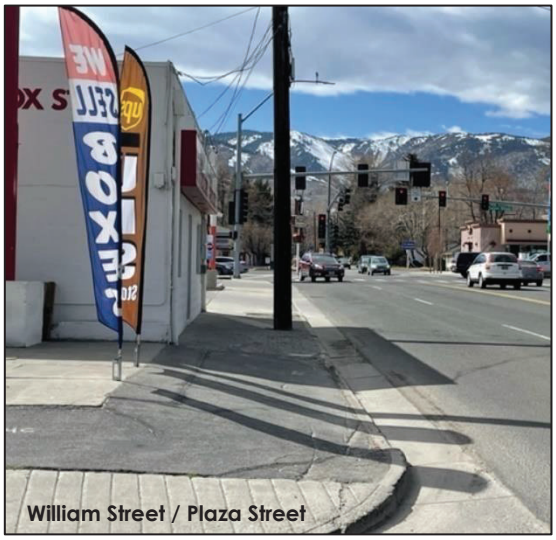
Location	Description	# Ped. Injury	# Bike Injury
Carson Street Intersection	Primarily rear-end collisions due to driver error with a slight spike in activity during October.	2	0
Stewart Street Intersection	High propensity for angle crashes involving failure to yield and/or disregard for signals. Heaviest activity during the Fall.	1	0
Stewart Street to Roop Street Segment	High propensity of angle crashes due to failure to yield right of way. Median channelization and access management should be considered.	0	0
Roop Street Intersection	Half of all crashes were rear end crashes due primarily to following too closely or failure to yield right of way. Advanced dilemma-zone detection may improve conditions.	1	0
Roop Street to State Street Segment	Rear-end and angle collisions were prominent due to failure to yield right of way and following too closely. Weekdays around 4:00PM stand out as the highest crash timeframe.	0	0
State Street Intersection	Rear-end crashes due to following too closely are the most prominent. Weekdays from 3:00 PM to 5:00PM account for the majority of crash activity.	0	0
State Street to Saliman Road Segment	Minor crash activity.	0	0
Saliman Road Intersection	High overall number of crashes. Highest crash type is rear-end due to following too closely. Summer months have the least crash activity with mid-day experiencing the highest crash activity.	1	1
Saliman Road to Gold Dust Way Segment	Angle crashes and rear-end crashes due to failure to yield right of way and following too closely during the week are the most prevalent. Additional median access control should be considered.	1	0
Gold Dust Way to Russell Way Segment	Minor crash activity.	0	0
Russell Way Intersection	Rear-ends are the most common due to either unknown or following too closely. A majority of crashes occurred during Fall and Winter months.	1	0

Pedestrian and Bicycle Facilities

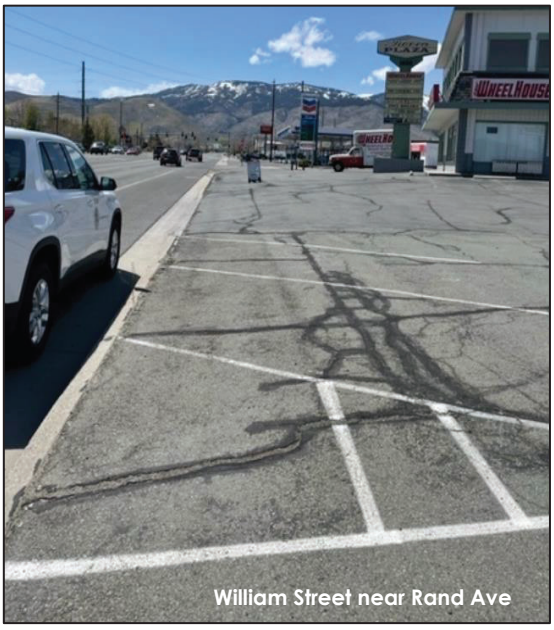
Sidewalks, bicycle lanes, and multi-use paths are interspersed throughout East William Street, with the quality of condition varying greatly. The Project map on Page 9 gives a visual summary of active transportation facilities along the corridor.

Sidewalks

- There are sidewalks on both sides of East William Street between Carson Street and Roop Street. The sidewalks are relatively narrow (about 4' in width) and have obstacles such as utility poles that hinder the pedestrian experience.
- Sidewalks are discontinuous on the north side of the street between Roop Street and Saliman Road. On the south side, pedestrians must use the path in Mills Park for about half of the journey between the two streets.



William Street / Plaza Street

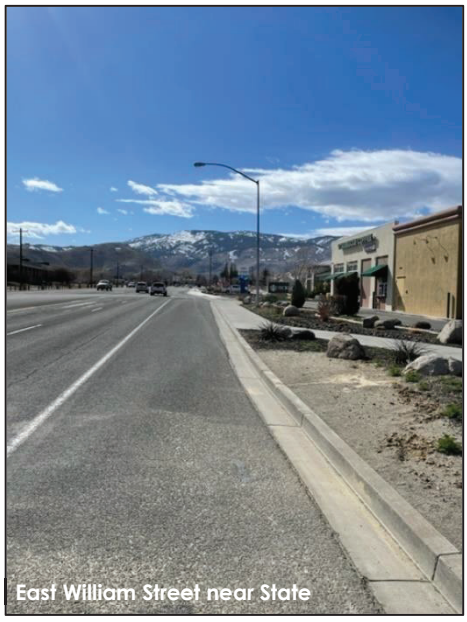


William Street near Rand Ave

- Sidewalks are discontinuous between Saliman Road and Humboldt Lane on the north side of East William Street. Pedestrians on the north side of the street must either cross to the multi-use path on the south side of the street at Saliman or walkthrough private parking lots to continue.
- There is a multi-use path between Humboldt and I-580 on the north side of East William Street.
- There is a multi-use path between Saliman and I-580 on the south side of East William Street.

Bicycle Facilities

- East William Street along the full Project limits is a designated part of the U.S. Bike Route 50 (USBR50) national bike routes.
- There are no bicycle facilities between North Carson Street and Roop Street.
- There are Class II bicycle lanes on both sides of East William Street between Roop Street and I-580, with a few interruptions at Saliman Road. These bike lanes are approximately the same width as a vehicle lane of travel which can be hazardous for cyclists, as drivers may feel comfortable pulling into the lane at any given time.
- Cyclists also have the option to use the multi-use paths on the south side of East William Street east of Saliman Road and on the north side of East William Street east of Humboldt Lane.


East William Street near State


East William Street / Saliman Road

ADA Issues

Generally, there are American with Disabilities Act (ADA) compliance issues at numerous intersections and segments along the corridor. This Project and any future projects along the corridor should ensure that ADA improvements are implemented.

Transit Analysis

Transit service in Carson City is provided by Jump Around Carson (JAC). Three of the four JAC fixed-route services, Routes 1, 2A and 2B have stops just off the East William Street corridor, one on Roop Street and one on North Carson Street. The JAC Transfer Center is located approximately ¼ mile south of East William Street on Plaza Street. JAC does not currently operate on East William Street.

Geotechnical and Pavement Investigations

Subsurface exploration was performed along the corridor on March 7, 2022. Soil samples were visually examined and classified during exploration. The field and laboratory studies resulted in the following:

- The presence of shallow groundwater will impact subsurface installation. Dewatering will be required.
- Granular low-cohesion to cohesionless soil encountered above and below groundwater is considered susceptible to caving. Open-cut excavations will be impacted by caving and/or sloughing during construction.
- A majority of the on-site soil excavated is anticipated to be reusable as Class E trench backfill.

The existing pavement is in good-to-fair condition. Overall, the primary distress is longitudinal cracking along the paving joints. Between North Carson Street and North Roop Street, there is some raveling and weathering on the surface.

Eight cores and 5 soil samples were taken throughout the Project limits. The average Hot Mixed Asphalt thickness varies throughout the Project and ranges from 4 inches to 12 inches. The subgrade between North Carson Street and North Stewart Street is significantly weaker compared to the rest of the Project limits.

Additional information regarding the Geotechnical and Pavement Analyses can be found in Appendices D and E, respectively, of Attachment C.

Drainage Analysis

A preliminary hydrologic/hydraulic and storm water analyses was completed per the guidelines provided in the Carson City Drainage Manual. Based on the analysis and information provided by Carson City, the preliminary hydrologic and hydraulic analyses showed the following:

- The 30-inch reinforced concrete pipe (RCP) at the intersection of North Carson Street and East William Street is undersized for the 10- and 100-year events.
- The 24-inch RCP under East William Street at North Roop Street is undersized for the 10- and 100-year events.
- The 18-inch corrugated metal pipe (CMP) under East William Street at North Saliman Road is undersized for the 10- and 100-year events and should be upgraded to RCP.
- The 18-inch RCPs at Rand Avenue are undersized for the 10- and 100-year events.
- During heavy rains, the gutters on Rand Avenue overflow and create large puddles at the intersection with East William Street.

Overall Existing Feel of the Corridor

The primary purpose of the existing East William Street corridor is to move vehicles and existing land uses are focused on vehicle traffic. There is a lack of aesthetics and insufficient pedestrian and bicycle accommodations. With the facility transitioning

ownership from NDOT to Carson City, there is a desire to enhance safety, modify the overall feel, and improve the space to better accommodate bicycles and pedestrians along the corridor.

Question 4 from the East William Complete Streets Survey: What are three words to describe East William Street TODAY?

Figure 3: Word cloud response to Question 4 of East William Complete Streets Survey

3.0 Corridor Analysis

Future Traffic Volumes and Level of Service

Future volumes for each segment and intersection within the Project corridor were forecasted using the CAMPO Travel Demand Model (TDM) for analysis years 2030 and 2050.

Future Segment Analysis

For future year segment analysis, the peak hour volumes were compared against threshold peak hour capacities to examine if existing travel lanes could be repurposed for other uses and users. The only segment that could be reasonably considered for a lane reduction from a volumetric standpoint is from Carson Street to Stewart Street. The comparison for this segment is shown in Table 6 below.

Table 6: Future Segment Analysis (Carson Street to Stewart Street)

Peak Period	Max. Segment Volume	LOS C Capacity (650)	LOS D Capacity (1,180)	LOS E Capacity (<1,250)
2030 AM	597	✓	✓	✓
2030 Mid-Day	591	✓	✓	✓
2030 PM	699	X	✓	✓
2050 AM	668	X	✓	✓
2050 Mid-Day	616	X	✓	✓
2050 PM	740	X	✓	✓

Future Intersection Operations Analysis

A LOS analysis was conducted using future year 2030 and 2050 traffic volumes and turning data to determine projected intersection operations. The results assume that all signals will be coordinated by 2030 and all timings have been optimized as such. Results for each year are shown in Tables 7 & 8 below.

Table 7: 2030 LOS Results

#	Intersection	Control Type	LOS Criteria	Peak Hour	2022 Conditions	
					Delay (S/V)[1]	LOS
1	Carson St & William St	Signal	D	AM	24.3	C
				MD	29.7	C
				PM	41.9	D
2	Stewart St & William St	Signal	D	AM	20.6	C
				MD	32.0	C
				PM	49.8	D
3	Roop St & William St	Signal	D	AM	19.5	B
				MD	25.8	C
				PM	33.3	C
4	State St & William St	Signal	D	AM	51.0	F
				MD	28.8	D
				PM	30.9	D
5	Saliman Rd & William St	Signal	D	AM	50.4	D
				MD	29.1	C
				PM	51.4	D
6	Gold Dust West Way/Commercial Dwy & William St	Signal	D	AM	18.1	B
				MD	24.2	C
				PM	23.4	C

Notes:

[1]"Average" control delays (in seconds/vehicle) are indicated for All-way Stop-Control (AWSC) and Signal controlled intersections. "Worst-movement delay" (in seconds/vehicle) is indicated for One-Way Stop-Controlled (OWSC) and Two-Way Stop-Controlled (TWSC) intersections.

Table 8: 2050 LOS Results

#	Intersection	Control Type	LOS Criteria	Peak Hour	2022 Conditions	
					Delay (S/V)[1]	LOS
1	Carson St & William St	Signal	D	AM	26.4	C
				MD	31.5	C
				PM	42.1	D
2	Stewart St & William St	Signal	D	AM	21.8	C
				MD	34.5	C
				PM	64.0	E
3	Roop St & William St	Signal	D	AM	20.7	C
				MD	27.1	C
				PM	35.0	C
4	State St & William St	Signal	D	AM	81.6	F
				MD	36.4	E
				PM	50.8	F
5	Saliman Rd & William St	Signal	D	AM	40.6	D
				MD	22.8	C
				PM	35.1	D
6	Gold Dust West Way/Commercial Dwy & William St	Signal	D	AM	25.4	C
				MD	30.0	C
				PM	36.4	D

Notes:

[1]"Average" control delays (in seconds/vehicle) are indicated for All-way Stop-Control (AWSC) and Signal controlled intersections. "Worst-movement delay" (in seconds/vehicle) is indicated for One-Way Stop-Controlled (OWSC) and Two-Way Stop-Controlled (TWSC) intersections.

Based on these LOS results, the following deficiencies have been identified:

- State Street 2030 (AM), 2050 (AM, MD, PM)
- Stewart Street 2050 (PM)

Mitigations to the deficiencies identified have been considered, and descriptions can be found in Attachment B. Below are summaries of the recommended mitigations.

- State Street - Prohibit left turns from State Street to eastbound East William Street using a raised median.
- Stewart Street - Add a dedicated right turn lane to northbound Stewart Street; reduce southbound Stewart Street to one lane. Revise Valley Street and the commercial driveway to the north to a right-in/right-out movement.
- North Roop Street – Add no-right-turn-on-red northbound. Extend the existing southbound left-turn lane and restrict left-turn movements to and from John Street.
- North Saliman Road - Remove westbound turn lane and incorporate leading pedestrian interval. Extend the northbound and southbound left-turn lanes. Eliminate the left-turn lane from eastbound East William Street to Rand Avenue.

- Gold Dust West Way - Incorporate protected left turns from East William Street. Extend westbound left-turn lane.
- Installation of medians in selected locations along the corridor to promote traffic calming, improve safety and access management, and provide opportunities for landscaping and pedestrian refuge locations.

Traffic Signal Communications and Interconnect

A field review of the traffic signal systems was conducted to determine traffic signal modification work items necessary to provide ADA compliant pedestrian facilities and accommodate possible roadway geometry changes. Each of the signalized intersections were evaluated. The traffic signal interconnect systems serving the intersections were also reviewed to identify opportunities to construct conduits for future fiber optic cables concurrently with utility work in the corridor. The traffic signals are currently connected to the City Operations Building and can be remotely managed via radio communication. Following the review, necessary Improvements broadly include:

- Modifying pedestrian push buttons/locations/signs/mounting heights
- Relocate pedestrian push button post for accessibility
- Install new signal poles with longer mast arms at Stewart Street and Saliman Road
- Reconfigure signal head locations for lane adjustments
- Replace signal heads to accommodate protected and/or permitted left turns
- Upgrading and replacing detection systems
- Relocating and replacing pull boxes
- Traffic Signal timing and optimization

More information can be found in Appendix A of Attachment C.

Environmental Implications

The East William Street Environmental Feasibility Study project outlines potential environmental and planning tasks that will need to be addressed during a future National Environmental Protection Act (NEPA) action. Detailed reports of the assessments on each environmental resources can be found in Attachment D. A summary of those potential impacts are outlined in Table 9.

Table 9: Summary of Environmental Resources

Environmental Resources	Low Potential Impact	Potentially Impacted	Significant potential Impact
Aquatic Resources	✓		
Biological Resources	✓		
Hazardous Material		✓	
Section 4(f)		✓	
Section 6(f)	✓		
Historical Resources	✓		
Title VI	✓		
Environmental Justice	✓		

Hazardous Material

This corridor consists of gas stations and previous railroad crossing properties. Some of these sites were active monitoring/remediation cases with the Nevada Department of Environment Protection (NDEP), however there are no active monitoring cases with the NDEP which indicates that remediation has been completed and the site has met the State's specific environmental requirements to close the case. Therefore, it is recommended that the City obtain a Certified Environmental Manager that is certified by NDEP for on call services in the event that potentially impacted soils are observed within the proximity of one of these properties or within the limits of the Project corridor. Impacted material would include discolored soils, soils saturated by liquids other than water, soils or groundwater that smells unusual, sheens on groundwater, orphan underground storage tanks, and any other observations that the Certified Environmental Manager provides. The Certified Environmental Manager would manage the handling, disposal, monitoring, sampling, etc. of any impacted materials per NDEP's regulations and requirements.

Section 4(f)

Section 4(f) of the United States Department of Transportation Act of 1966 requires transportation projects to address the Project's effects on the natural and social environment, parks, recreation areas, wildlife and waterfowl refuges, and historic sites. Potential Section 4(f) properties associated with the Project include Mills Park, located at 1111 East William Street, immediately adjacent to the Project area and East William Street. Additional potential properties include adjacent parcels with known Historic Structures (age 50 years or older). However, a further evaluation is needed to confirm the unrecorded, historic-aged structures adjacent to the Project area.

Right of Way, Access, and Utilities

Right of way, access, and existing utilities vary along the corridor. The right of way for East William Street was dedicated to Carson City from NDOT in 2009. The right of way width varies with in the Project corridor with a minimum width of approximately 80 feet wide on the western end of the Project, to a maximum width of approximately 140 feet near to I-580 on the east end of the Project.

Access to East William Street is generally unrestricted except for the eastern-most end near I-580. There are numerous driveway approaches along the Project corridor serving a variety of commercial and residential uses. Title 18 Appendix, Division 12 of the Carson City Municipal Code details the current access management standards for arterial roadways, which includes East William Street. Table 10 and Table 11 below summarize the driveway and intersection clearance requirements found in the municipal code.

Table 10: Required Spacing between Driveways

Street Classification and Posted Speed Limit	Center to Center Spacing Between Driveways (feet) Preferred	Center to Center Spacing Between Driveways (feet) Minimum
Arterial Street		
30 mph speed limit	185	125
35 mph speed limit	245	150
40 mph speed limit	300	185

Table 11: Minimal Intersection Corner Clearance for Commercial Driveways

Street Classification	Minimum Intersection Corner Clearance (feet) Signalized Condition	Minimum Intersection Corner Clearance (feet) Stop Sign Condition
Arterial Street	230	150
Collector Street	175	85
Industrial Street	175	85
Local Street	175	85

The driveway frequency is extremely high such that portions of East William Street will not meet the City's criteria for driveway spacing. Many of the driveways are established and serve as the only ingress and egress for the property. Design alternatives may consider alteration of driveway locations or elimination of certain movements to improve safety and traffic operations within the corridor.

A GIS and field inventory of visible utilities within the right of way was conducted for the corridor. This preliminary effort identified locations of underground water, sewer, and stormwater infrastructure, utility poles, signal poles, pedestrian push buttons, power lines, communication and pull boxes, and other miscellaneous utilities. Existing utilities identified to be in poor condition and located below proposed roadway reconstruction areas (to be further refined in the design process) should be incorporated into the Project for a "dig-once" approach.

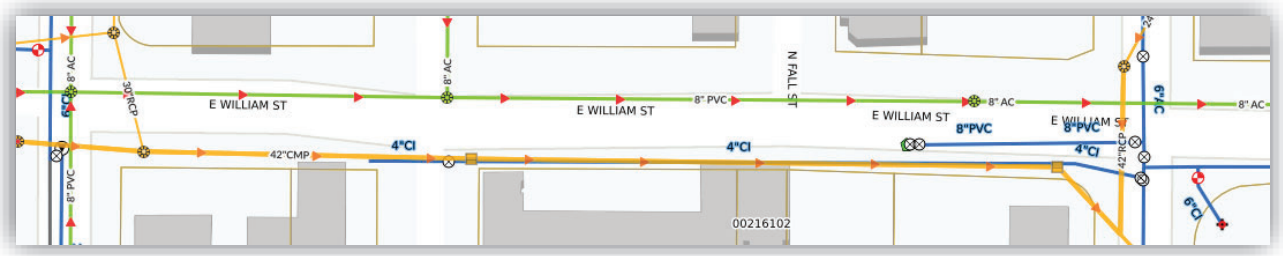


Figure 4- Utility Overview Map

Future Transit Routes

A planned JAC transit route refresh is scheduled to happen within the next few years. This refresh will propose several transit lines to run throughout the entire Project corridor.

4.0 Public Outreach Efforts and Initiatives

A successful transportation project is one that works for its users. As such, Carson City staff partnered with CAMPO, Taylor Made Solutions (TMS), and Michael Baker International to initiate a variety of methods to both inform and solicit feedback from Carson City stakeholders. A Public Involvement Plan (Attachment E) detailed goals and specific measurable objectives of public outreach some of which are highlighted below.


February 8, 2022: Public Outreach event at the Carson City Community Center

East William Complete Street Survey

A 10-question survey was distributed throughout Carson City to determine how and why people travel on East William Street and priorities to focus on throughout the Project.

Most people travel to businesses in their personal vehicle along East William Street. A little under two-thirds of respondents are familiar with Complete Streets projects. There is still an opportunity to educate the public about Complete Streets goals, objectives, and methods. Respondents generally prioritized safety improvements, traffic operations, beautification and bicycle and pedestrian enhancements equally throughout the corridor as seen in Question 5 below. The survey also asked respondents to describe their current impression of the corridor (results on Page 21) and their vision of the future corridor, seen below (Question 10).

Q5: Please rank your priorities for the East William Complete Streets with 1 as the highest.

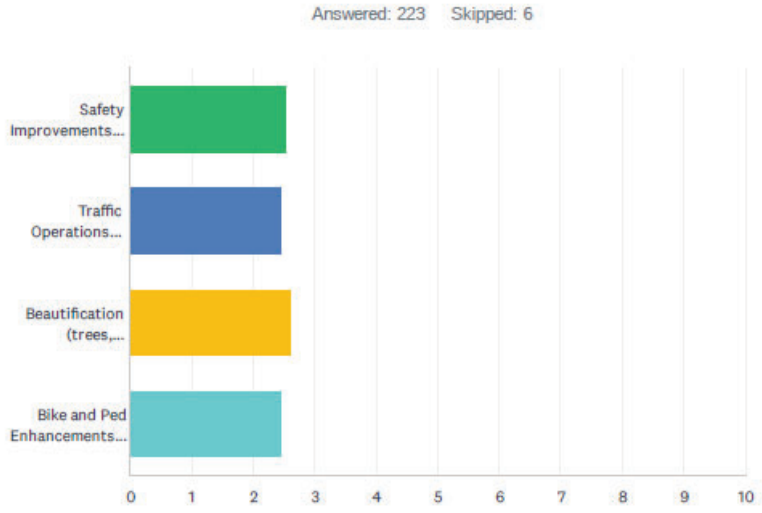


Figure 5: Response to Question 5 of East William Complete Streets Survey

Q10: What are three words to describe a transformed East William Street?

Figure 6: Word cloud response to Question 10 of East William Complete Streets Survey

East William Complete Streets Interactive Comment Map

120 comments were collected within the East William Complete Streets Comment Map. Participants commented on landscaping, medians, unsafe crossings, traffic incidents, bike safety and awareness, connected pedestrian pathways and stormwater issues. Comments from this effort were collected to inform the design process. Specific comments about a safe crossing across East William Street at Mills Park, improving traffic flow and safety at the Saliman and East William Street intersection and examining safe turning options for the abundant driveways along East William Street were included in Complete Streets design discussions.

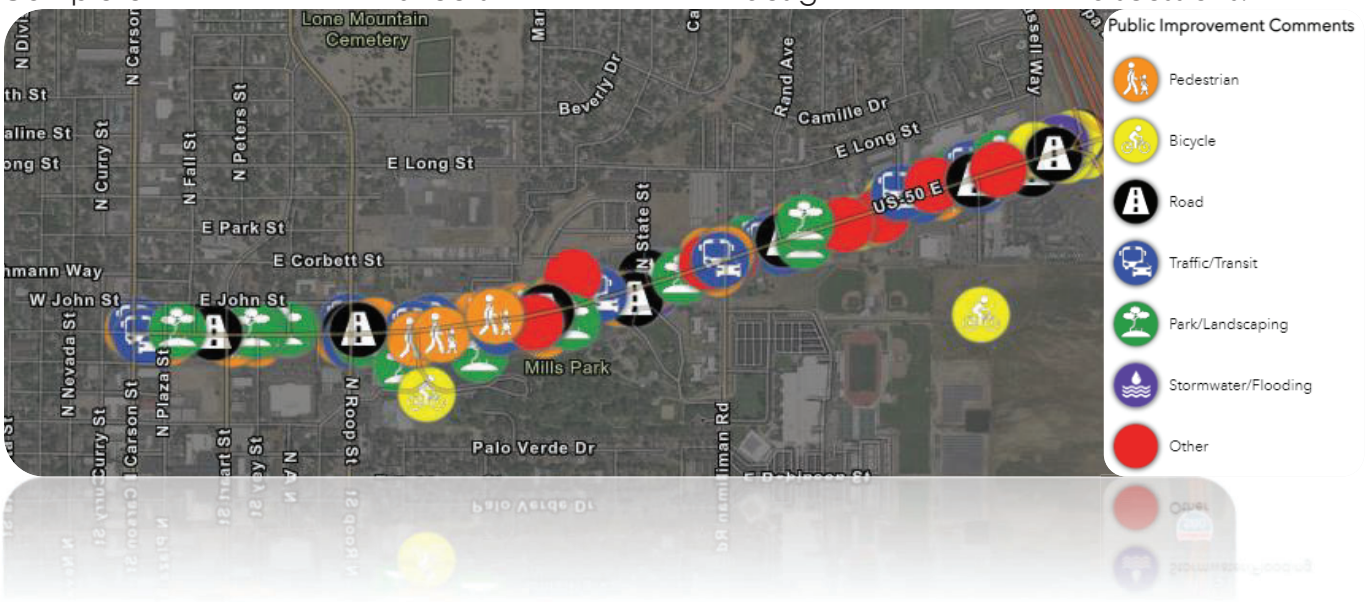


Figure 7: East William Complete Streets Interactive Comment Map

Public Meeting and Regional Transportation Commission (RTC) Meeting

A public informational meeting was held at the Carson City Sherriff's Office on May 3rd, 2022. Approximately 40 community stakeholders and interested parties were in attendance, and City staff along with consultant teams presented the preliminary design concept. The meeting attendees were encouraged to ask questions and express concerns. Additionally, City staff presented the preliminary design at the May 11th Regional Transportation Commission (RTC) meeting. These two meetings provided arenas for stakeholder engagement and feedback.

5.0 Design Alternative Development

Alternatives developed for each of the different segments included varied configurations of bicycle, pedestrian, and landscape improvements, including dedicated bike lanes, shared-use lanes, or buffered bike lanes along with varying widths of sidewalk and landscape areas. These design alternatives were evaluated based on their ability to meet the goals of the Project, the analysis conducted, and information gathered through the public outreach process. To minimize Project costs, only alternatives with minimal right of way impacts (minor sidewalk and driveway transitions) were developed.

Alternatives Analysis

Existing wide traffic lanes and shoulders provides the opportunity and ability to narrow lanes and accommodate new bicycle lanes, wider sidewalks, and more landscaped area. Through modifications to the road cross sections, opportunities to encourage slower speeds, provide spacing between bicyclists and vehicles, as well as separate pedestrians from vehicular traffic allow for a safer, more comfortable, multi-modal experience while minimizing impact on vehicular level of service.

While the Project corridor was generally analyzed in three segments, analysis conducted indicated that the segment between North Carson Street and Roop Street could be divided into two segments at Stewart Street, thus creating four total segments. The preferred alternative for the Project is presented using four segments listed below.

- Segment 1 – North Carson Street to Stewart Street
- Segment 2 – Stewart Street to Roop Street
- Segment 3 – Roop Street to Saliman Road
- Segment 4 – Saliman Road to Gold Dust Way (I-580)

Several alternatives were developed for each segment. Detailed descriptions of these can be found in Attachment C.

To complete the alternatives analysis, evaluation criteria was developed. Each alternative was then evaluated and compared against the other alternative(s) to identify the one that best meets the needs and goals of the Project, becoming the preferred alternative. Specifically, each alternative was compared with regard to the following:

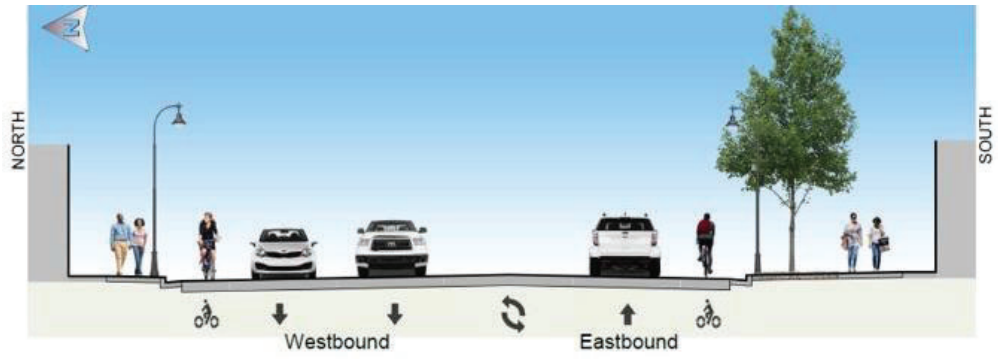
- Transit operational conflicts with bicycles
- ROW acquisition requirements
- Capital cost, including construction materials and labor
- Maintenance costs
- Opportunity areas to place LID improvements
- Pedestrian safety and enjoyment with separation from automobile traffic
- Wide sidewalk widths
- Designated bicycle lanes
- Bicycle enjoyment with separation from automobile traffic
- Opportunities for beautification, including landscaping and seating

- Automobile enjoyment with separation from bicycles

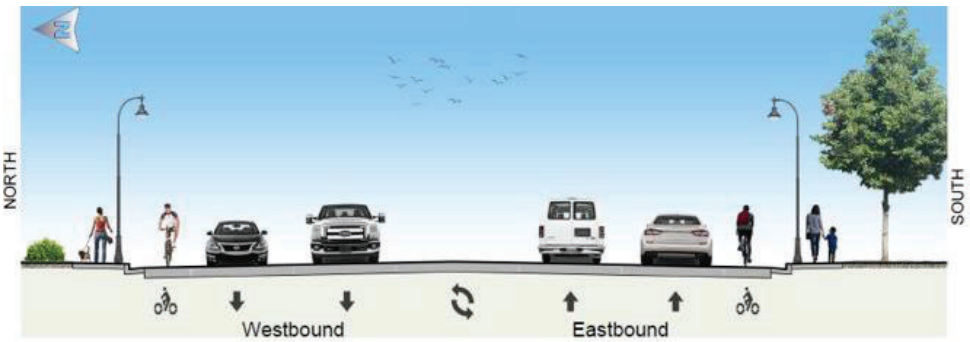
Preferred Alternative

The preferred alternatives for each of the four segments is shown below. Several universal improvements were included in each segment including travel lane and intersection reconfigurations recommended from the traffic analysis, reduced automobile lane widths, signal modifications and interconnect improvements, transit stops, drainage and LID water quality improvements, lighting and utility improvements, and pavement reconstruction/preservation.

- Segment 1 - North Carson Street to Stewart Street. The alternative will remove 1 eastbound travel lane and provide a dedicated bike lane in each direction. A standard sidewalk will be installed on the north side of the road and a landscape area and standard sidewalk will be installed on the south side of the street.

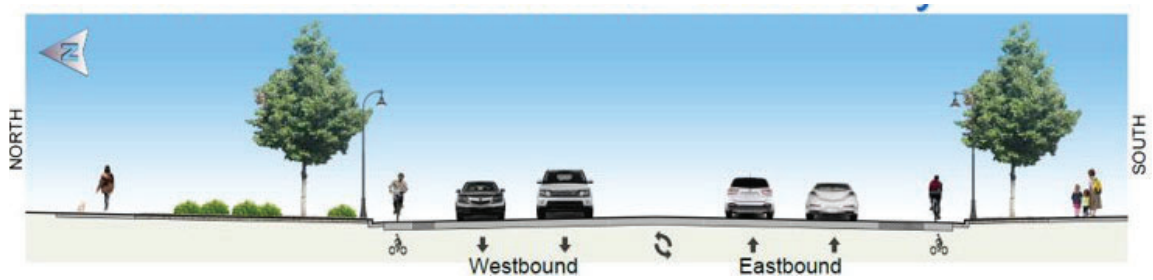


- Segment 2 – Stewart Street to Roop Street. The alternative will have a dedicated bike lane in each direction and standard sidewalks on both sides. Existing landscaping will remain.



- Segment 3 – Roop Street to Saliman Road. This alternative will have buffered bike lanes in each direction and wide sidewalks on the north and south sides of the street. The existing multiuse path on the south side of the road will remain. Landscaping will be added throughout. This segment will include additional parking along Mills Park and electric vehicle charging stations.

- Segment 4 – Saliman Road to Gold Dust Way. This alternative will have buffered bike lanes in each direction and wide sidewalks and landscaping along the north side. The north curb line will be shifted south, reducing the overall road width. Existing sidewalk and landscaping on the south side of the road will remain. From Gold Dust West Way to I-580, the roadway will be restriped to create buffered bike lanes in each direction.



The preliminary anticipated cost of the preferred alternative is shown in Table 12 below.

Table 12- Preferred Alternative Cost Estimate

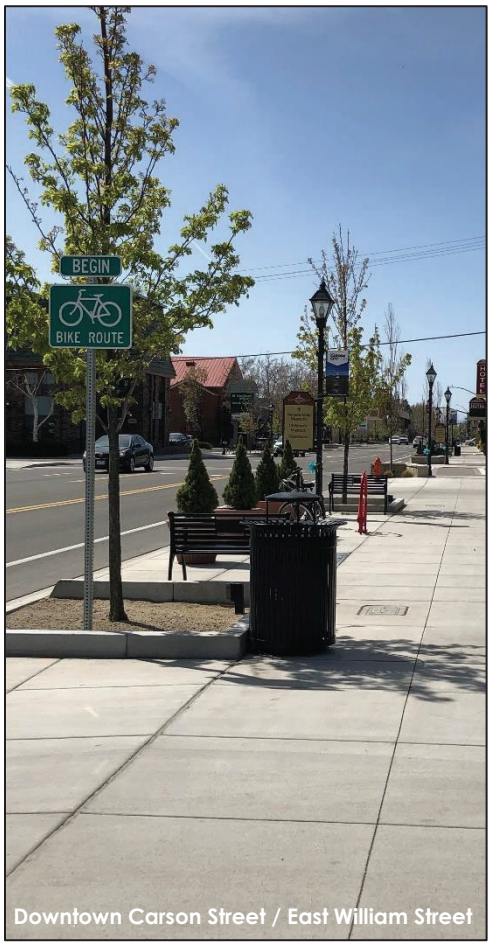
Items	Cost
Complete Street Roadway Improvements	$7,305,000
Sewer Improvements	$727,000
Water Improvements	$2,213,000
Storm Drain Improvements	$1,729,000
Traffic Signal and Lighting Improvements	$2,417,000
Mobilization/Demobilization	$720,000
Traffic Control	$1,008,000
Contingency	$4,318,000
Total	**$20,437,000**

Theme and Neighborhood Character

Presently, there is not a discernable theme or artistic character along the Project corridor. Future design phases will introduce potential sites for public art installation along with options for landscaping features. Generally, the western-most part of the corridor will have a theme more consistent with the Downtown Carson corridor character, while the eastern-most part of the corridor will be more consistent with NDOT's theme at I-580. The aesthetic design in between will likely act as a transition between these two themes.

Opportunity for art and locations to display the corridor and City's history was noted as a part of the public outreach effort. Future design phases will incorporate locations where art and the City's heritage can be displayed.

Landscaping



Downtown Carson Street / East William Street

Landscape considerations along the Project corridor will include environmental considerations, viewsheds and visual analysis, as well as traditional landscape design techniques. Landscaping can provide a sense of place illustrated by regional and perennial plantings within medians and along the Project corridor. Landscaping can provide insulation and safety to bicyclists and walkers, create strategic porous surfaces for ground water to percolate and absorb carbon dioxide and add oxygen to the atmosphere. The western portion of the Project corridor will continue the landscaping and aesthetics found along the Downtown Carson corridor. The middle portion of the Project corridor can include the trees, shrubs, and perennials found along the South Carson Complete Streets corridor. Throughout the eastern portion, and the whole of the Project

South Carson Complete Streets Multi-Use Path Landscaping

corridor will be considerations of the Landscape and Aesthetics Master Plan for the Nevada State Highway System (NDOT).

(https://www.dot.nv.gov/home/showpublisheddocument/6888/636256137185670000)

In this Master Plan, the US50 corridor is prescribed a Regionally Adapted Landscape treatment through Carson City and leads into a Native Revegetation and Enhanced

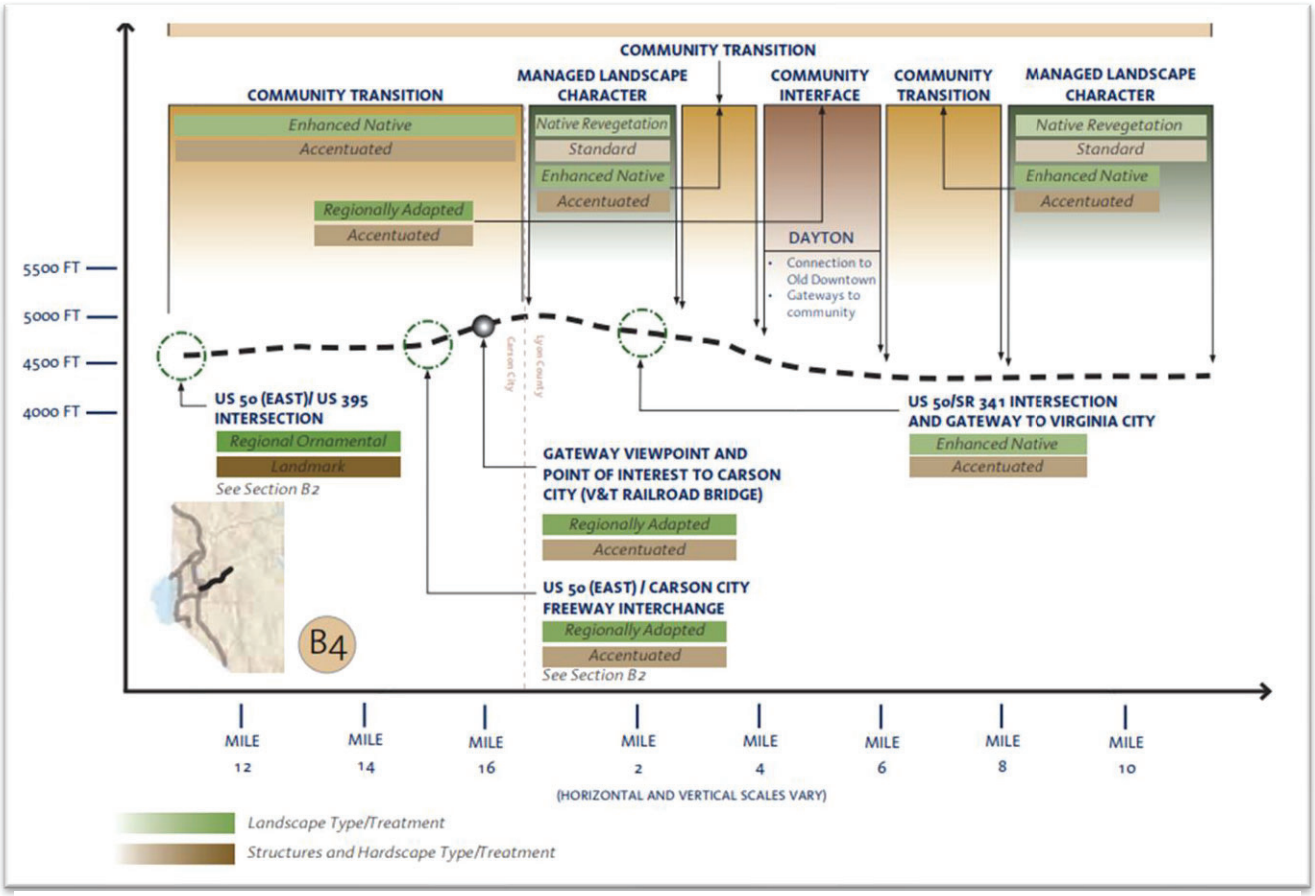


Figure 8: US 50 (East) / US 395 Landscape Design from the Landscape & Aesthetics Descriptions from the Master Plan for NDOT

Native landscape towards Lyon County. A Regionally Adapted landscape includes

combinations of Great Basin and Sierra Nevada plants that are layered to provide and overstory of trees and thick understory of shrubs and perennials. Plants can be selected for seasonality, form, color, and texture, but must be consistent with the Carson City Community Development Standard Details for Landscape Plans (https://www.carson.org/government/departments-a-f/community-development/planning-division/current-planning-zoning/landscape-detail-sheets).

Choices in landscape and aesthetics can provide an opportunity for community outreach and engagement with Project Corridor stakeholders and the community.

6.0 Moving Forward – Next Steps – Planned Outreach Opportunities

Upon completion of this Study, the Project will advance into formal environmental review and design plan development. As the Project progresses through those steps, there will be several opportunities for public stakeholder involvement. Design workshops will initially involve individual property owners and businesses, progressing into stakeholder groups once specific impacts are identified. A construction impacts workshop will inform the public of construction duration, access restrictions, and other impacts to expect during construction.

The City will present progress of design to the Redevelopment Authority Citizens Committee (RACC), the Regional Transportation Commission (RTC), and the Board of Supervisors (BOS) near design milestones. Each of the presentations will be opportunities for the public to be informed of and provide comment on development of the Project.

The Project has been added to CarsonProud.com, the City's website used to provide updates to the public on larger scale projects the City is designing and constructing. Periodic updates will be posted to the website noting Project progress, requests for input, and upcoming meetings.