

# Castle Rock Downtown Mobility Master Plan

July, 2019



**Downtown Mobility Master Plan** 

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#### **List of Acronyms**

ADA – Americans with Disabilities Act AV- Autonomous Vehicle CDOT - Colorado Department of Transportation **CIP-** Capital Improvement Project CV- Connected Vehicle DDA – Downtown Development Authority DMMP - Downtown Mobility Master Plan DMA – Downtown Merchants Association DOD – Downtown Overlay District DOT – Department of Transportation EB - Eastbound EDC – Economic Development Commission FEMA – Federal Emergency Management Agency FHWA – Federal Highway Administration HAWK – High-Intensity Activated Crosswalk I-25 – interstate 25 LOS – Level of Service NACTO - National Association of City Transportation Officials NB – Northbound PEL – Planning and Environmental Linkages PPP - Public Private Partnerships RRFB- Rectangular Rapid Flashing Beacon SB – Southbound TDM - Transportation Demand Management TMA - Transportation Management Association TMO - Transportation Management Organization TMP - Transportation Master Plan TNC – Transportation Network Company UPRR - Union Pacific Railroad US 85/87 – United States Route 85/87 V2I- Vehicle-to-Infrastructure V2V- Vehicle-to-Vehicle V2X- Vehicle-to-Everything or Vehicle-to-Anything VMT- Vehicle Miles Traveled

WB - Westbound









## **Downtown Mobility Master Plan (DMMP)**

As a thriving community, the Town of Castle Rock is experiencing rapid changes, no less within its Downtown, both in its physical landscape and its mobility needs. Downtown's rapidly changing environment and evolving mobility interests are beginning to create pressure on the Town's traditional transportation systems.

As Downtown Castle Rock grows with new generations of businesses, an emerging residential base, and increasing number of visitors, the transportation systems must adapt to serve their evolving mobility needs, while not forgoing the historical, smalltown charm on which the Town is founded.





The Town of Castle Rock has been studying its Downtown for several years to help guide both public and private investments so they best suit the needs of Downtown's expanding number of employees, emerging residents, and growing visitor base.

- The Castle Rock Downtown Master Plan (2008) set the vision and established character districts for Downtown that form the foundation for its growth. The Downtown Development Authority (DDA) was created from the Downtown Master Plan to provide support in implementing the vision.
- Downtown Development Authority Plan of Development (2008) provides a framework and set of tools and strategies for incremental investment in Downtown by both public and private partners. The Plan encourages smallscale, mixed use investment and visual improvements, such as streetscapes and gateways, to spark vitality in Downtown to make it a stronger destination.
- The Castle Rock Transportation Master Plan (2017) identifies long-range transportation strategies Town-wide. The plan recognizes Downtown Castle Rock's mobility challenges are unique from Town-wide challenges. The plan recommended the development of a Downtown-specific mobility plan more focused on active transportation modes, transportation demand management, and alternative intersection designs for limited public right-of-way to determine a specific path forward for resolving future Downtown transportation needs.
- The Castle Rock Downtown Parking Study (2017) provides a guide for the Town on parking management and strategies that focus on access management and mobility and allow people to travel using their preferred method of transportation – car, bicycle, or walking, rather than focusing on warehousing cars.

The DMMP study area is comprised of the Downtown area bounded by Interstate 25 (I-25) on the west, Wolfensberger Road on the north, the Union Pacific Railroad (UPRR) tracks to the east and Plum Creek Parkway on the south. The Craig and Gould Neighborhood and Douglas County Fairgrounds to the east of Downtown will also be considered during the study as impacted areas during Downtown special events.



### **PROJECT STUDY AREA**





## **Project Purpose**

The Downtown Mobility Master Plan (DMMP) leverages the previous work and looks to take a holistic view of Downtown transportation and mobility needs. The plan seeks to create solutions to enhance mobility while preserving the uniqueness that makes Downtown a place that people want to live, work, and visit. The DMMP will provide both a framework and toolkit for the Town to use to manage and grow the Downtown mobility network in a way that aligns with the community's vision for a vibrant and mobile Downtown for everyone to enjoy.

## **Report Organization**

## COMMUNITY PROCESS AND MOBILITY VISION

Establishes the Downtown mobility vision and associated goals and objectives. It also outlines the community engagement efforts which helped to shape the vision and objectives.

## DOWNTOWN ENVIRONMENT

Summarizes the existing transportation and mobility environment and land use conditions in Downtown in relation to infrastructure, plans, policies, and regulations. Identifies gaps that can be addressed by the DMMP.

## DOWNTOWN TRANSPORTATION FRAMEWORK

Identifies a set of mobility strategies for Downtown Castle Rock, which look at infrastructure, policy, and future planning efforts towards a diverse Downtown transportation system.

## IMPLEMENTATION ACTION PLAN

Outlines a reasonable work plan for the Town to pursue the DMMP strategies in a way that aligns with the mobility vision and is driven by the mobility goals and objectives.











#### **Downtown Mobility Master Plan**





## **Community Process**

The Castle Rock DMMP was developed through a five-activity process of gathering and coordinating input from the Town, its mobility partners, Downtown Stakeholders, and the Community at-large.

- The first and second activities of the effort gathered input on goals and priorities to establish a Mobility Vision, Principles, and Success Measures for the DMMP. These defined the overall expectations of the process.
- The third activity of the DMMP identified specific Downtown transportation issues needing attention from the Town.
- Activities four and five identified and presented recommended transportation strategies and a timeline of actions for the Town, its mobility partners, Downtown Stakeholders, and the Community at-large to review, comment on and confirm.



Citizens Reviewing Material during Workshop #2

**OUTREACH INFLUENCE** 





Community Gathering in Festival Park

# Mobility Vision, Principles, and Measures of Success

The first stages of the DMMP sought to identify a shared vision for mobility in Downtown Castle Rock that aligns with established community values and goals for Downtown. Input from the community generated the following vision:

"Mobility in Downtown Castle Rock supports a vibrant core for local businesses, residents, and visitors to enjoy the unique amenities and events that Downtown has to offer. Lively and inviting blocks create a safe environment for people to comfortably walk, bike and gather, while a connected and cohesive network of low speed shared streets, alleys, and trails support movement between Downtown, neighboring areas, and the community at-large. Investing in growth, balanced with a commitment to the historic character of Castle Rock, makes Downtown's mobility network support Downtown as a place where people want to live, work and visit."





#### **Downtown Mobility Master Plan**

Mobility Principles and associated Measures of Success describe quantifiable elements of the Mobility Vision for Downtown Castle Rock. These principles and success measures provide a framework to guide an evaluation of specific strategies and actions on their ability to adapt to evolving mobility demands and how they meet the Community's expectations for transportation improvements in Downtown.

#### PRINCIPLE 1 – DOWNTOWN IS CONVENIENT AND ACCESSIBLE TO ALL PEOPLE

- Provide mobility options for people of all ages and abilities
- Improve Americans with Disabilities Act (ADA) compliance throughout Downtown
- Have a network of safe and connected pedestrian and bicycle infrastructure between Downtown and surrounding communities
- Enhance Downtown connectivity by improving alleyways and increasing the utilization of Jerry Street
- Balance parking needs without detracting from mobility options in Downtown
- Address vehicular congestion throughout Downtown through efficiency

## PRINCIPLE 2 – THE DOWNTOWN ENVIRONMENT IS PERCEIVED AS SAFE AND CONVENIENT

- Provide adequate walkways throughout Downtown
- Establish connected sidewalks and paths between Downtown amenities, gathering spaces, and public parking locations
- Ensure intersections and crosswalks are safe for pedestrians, bicycles, and motorists
- Create active community spaces that encourage residents and visitors to spend time in Downtown
- Retain and/or increase available on-street parking







#### PRINCIPLE 3 – DESIGN AND DEVELOPMENT STANDARDS ACCOMMODATE THE UNIQUE NEEDS OF DOWNTOWN

- Ensure transportation standards for Downtown are flexible and adaptable to protect Downtown's character
- Make certain that sidewalk standards support a generous pedestrian realm and amenities
- Ensure roadway/traffic standards balance driver, pedestrian, bicycle, and transit needs
- Design a flexible curb-side management plan to address evolving transportation needs, including those of trucks and mobility service providers

#### PRINCIPLE 4 – DOWNTOWN HAS A MODERN TRANSPORTATION SYSTEM THAT DOES NOT DETRACT FROM THE HISTORICAL, SMALL-TOWN CHARM NATIVE TO THE AREA

- Implement transportation infrastructure and technologies that are visually and operationally appropriate
- Position Downtown for future transit, be it the Colorado Department of Transportation's (CDOT) Bustang Service in the near term, or local circulation in the long-term
- Invest in today's transportation system while considering future transportation needs









Stakeholder Interviews & Discussion

## **Community Engagement**

Input from Town Staff, their mobility partners, Downtown Stakeholders, and the Community at-large created the foundation for the development of the DMMP. Understanding the expectations and values of the community was particularly important to the formulation of the Mobility Vision and Principles that guided this plan.

## **Agency Stakeholder Focus Groups**

A series of stakeholder interviews and focus group sessions were held with Town staff, Douglas County Staff, members of the CDOT, and Downtown Stakeholders to gather input on their mobility vision for Downtown Castle Rock. Discussions with the different stakeholders provided a forum to identify a range of concerns, desired outcomes, and potential solutions to mobility in Downtown.

These initial discussions uncovered some common themes that were of interest to multiple agencies and stakeholders, shown in the **Table** below.

	-			Ager	ncies and !	Special Int	erest Groups S	takeho	der Input					
Themes	Dev. Services	Special Events Committee	Police & Fire	Douglas County	Public Works	Parks & Rec.	Town Manager & Community Relations	EDC DDA DMA	CDOT Transit & PEL	Bike & Ped Groups	Public Works Comsn.	Planning Comsn.	County Transit Solutions Committee	Total
Bike/Ped. Safety	*	*	*	*	*	*	*	*		~	~	~	*	12
Ped. Crossings	*	1	~	~	~	~	~	1		~		*	~	11
Traffic	*	~	*	*	~		~	*	*		~	*	~	11
Event Traffic	~	1	~	~		~	*	*		~		~		9
Streetscape	~		*		*	~	~	1		~				7
Trails	1	1	~	~	~	~			1011	~		~		7
Dev. Standards	~		~		~		~	~		~		*		7
Parking	1-11	×			~		*	~		~	¥		*	7
Transit Positioning	~			*	*			~	~		~		×	7
Traffic Calming	~		~				~	~		~	~	~		7
Residential Impacts	~	~	1	~	~		×		-			*		6
Connections to Neighborhood	*	1		~	~	*				~	_			6
Public Maintenance					~	*	Ý	1.1	V					4
Gateways	*					*	~							3





#### Community Questionnaire Online Form

#### **Community Questionnaire**

A questionnaire was disseminated, via the Town's website, to gather feedback on the Community's perceptions of Downtown transportation facilities and traffic operations. Full questionnaire results are shown in the Appendix of this report.

Over 85% of the quesitonnaire's respondents visit Downtown several times per week. Roughly 60% of the respondents indicated shopping and entertainment are their primary reasons for going to Downtown. These results matched the input from the participants of Workshop #1.

The top transportation challenges respondents indicated should be addressed by the DMMP were congestion (41%), parking (17%), and safety (13%). Five percent of respondents thought public transit was a top challenge which should be addressed.

Interestingly, the most commonly identified mobility improvement, other than parking, suggested by respondents was to establish public transportation, specifically a Downtown shuttle or circulator. Respondents specifically noted that a shuttle would allow people to park outside of the immediate Downtown and ride the bus/shuttle in. Another specific use was to help people, including those who do not drive, move more easily through Downtown, having the bus stop at a few key points of interest in a continuous route.



#### Top Transportation Challenges

#### Top Transportation Improvements



## **Public Workshops**

#### Workshop #1

The first Public Workshop was held on June 7, 2018 from 6:00pm-8:00pm at the Downtown Police Station.

The Workshop was organized to gather input from the Community on the things that they like and dislike related to transportation and mobility in Downtown. Participants were also asked to identify their priority concerns related to transportation and circulation in Downtown.



*Key elements of Downtown that are highly valued by Workshop #1 participants are:* 

- ▲ Historic architecture and small-town charm;
- Community gathering spaces specifically Festival Park;
- Eclectic shops and entertainment; and
- ▲ Ease of mobility and accessibility.

#### Workshop #2

A second Public Workshop was held on October 17, 2018 from 5:30pm-7:00pm in the Castle Rock Town Hall.

Participants were encouraged to review and comment on the mobility alternatives for the various modes of travel in the DMMP. Those in attendance provided their input on alternative improvements for vehicular, pedestrian, bicycle, transit, and transportation policy. Input received at this workshop was used to identify or confirm the preferred improvements and recommendations in this study. Full size of all boards are available in the Appendix.



*The identified priority areas for transportation improvements in Downtown (in order of priority) were:* 

- ▲ The intersection design of Wilcox Street at I-25;
- High traffic speeds along Wilcox and Perry Streets;
- Availability of parking; and
- ▲ Poor driver lines of sight at many intersections.



Attendees Discuss Materials at Workshop #2



#### Downtown Mobility Master Plan





## **Downtown's Changing Environment**

Downtown Castle Rock is a vibrant commercial mixed-use district with a strong employment base and an emerging residential population. Because it is unlike anywhere else in the Town, it has unique mobility needs that are evolving differently than the rest of the Community.

The majority of DMMP's study area, north of South Street, was established in 1874, when the original Town of Castle Rock Subdivision was platted and incorporated. This original plat, along with the Town's Craig and Goulds and Grandview Additions, are the three subdivisions within the Town of Castle Rock that adhere to gridded street network with very walkable, 380-foot blocks.

From these original areas, Downtown Castle Rock emerged as the Community's center for civic and cultural activities. As a result, Downtown Castle Rock's buildings developed in a traditional form. Buildings in Downtown generally sit next to the streets, without being set-back like most of the buildings in Town. Parking ratios for these buildings, because of when there were built, are generally lower than the rest of the Community and are accomplished by on-street parking options.

This more traditional form of development limits the Town's ability to widen Downtown roads as a solution to transportation congestion issues, as widening faces physical constraints, higher costs, and potential business impacts.

As a result, mobility strategies for Downtown must be contextual and recognize the interrelationship between land use and transportation.

These contextual strategies broaden the definition of transportation planning to include the movement of people by transit, bicycling, and walking, in addition to cars. They recognize the value of improving the quality of a trip, as well as utilizing land use and policy solutions to resolve transportation challenges.



1937 aerial of Castle Rock showing the original Town of Castle Rock Subdivision plat along with the Craig and Goulds Subdivision plat and their 380-foot blocks.

#### **Changing Mobility**

- Between 1871 and 1919 wagon trails and the Denver and Rio Grande Railway provided the primary connections between Denver and Castle Rock.
- Old State Route 1 (US 85/87, utilizing WIIcox Street) was the primary north-south highway connecting Denver to Castle Rock between 1919 and 1963.
- I-25 opened in 1963 between Denver and Castle Rock.
- CDOT is now planning the expansion of I-25 which will include intercity bus service (Bustang) and is considering the corridor for longer-term, high-speed rail connections.



Downtown Castle Rock's traditional form of development requires more innovative transportation solutions that incorporate multimodal considerations.





The shared economy is impacting car ownership as people are provided mobility choices. Towns and cities throughout the State are also experiencing increases in active transportation by all demographic age groups.

## **Emerging Mobility Trends**

In addition to Downtown's physical uniqueness, there are several emerging mobility trends that are impacting the existing and future land use and transportation environments in Downtown Castle Rock.

- Downtown Castle Rock is attracting a new generation of residents that favor more compact land uses and active transportation modes, including walking, cycling, and shared mobility. The personal car is a lower priority to this group than to previous generations.
- It is estimated that Douglas County will experience a 500% increase in the population age 65 and older between 2005 and 2030 (2009 Douglas County Transportation Master Plan). This demographic shift is accompanied by changing mobility needs in terms of methods of mobility and destinations to which transportation is needed.
- There is a national trend towards the shared economy, which is impacting transportation choices, and the ongoing advancement of automated vehicles will only further transition mobility into a service. These technologies are changing the way we think and plan for automobiles in our communities, and especially our Downtowns.





#### **Downtown Expectations**

Land use is the major driver of transportation conditions. Understanding the Community's land development regulations, along with current and future growth trends, uncovers the root causes and identifies future challenges for the Downtown transportation system.

In 2008, the Town established a Downtown Overlay District (DOD), which made a formal change to the Town's municipal code and amended the Zoning District Map to put forth regulations specific to development within Downtown. Under the DOD guidelines, there are three distinct districts of Downtown which are shown on the map– North, Core, and South Overlay Districts.

The DOD establishes Downtown-specific regulations that are unique from the rest of the Town, with the purpose of encouraging development which adheres to many of the Town's traditional development patterns: compatible land use practices, protecting property values, and maintaining safe and efficient multi-modal transportation networks.

The Downtown Overlay District establishes the development expectations for Downtown Castle Rock. Some of the development requirements are shown below.



Category	Downtown Overlay District Standard
Duilding Height	Downtown Core District height limit of four stories and 60-feet
building Height	South and North Districts cannot exceed six stories but have no maximum height limitation.
Lot Coverage	No maximum lot coverage for development in Downtown, 100% coverage is acceptable
Building Setbacks	Standard for buildings Downtown are a zero-foot setback, with a maximum of 20-feet
Development Type	Flexibility as to the types of developments that are allowed in the Downtown
Parking	Ordinance 2018-015 requires all new development over 2000 square feet to provide one parking space per 500 square feet and one on-site parking space per unit within a multifamily residential development
Sidewalks	All sidewalks must be a minimum of 8-feet wide



## **Special Events and Downtown Development Expectations**

Another trend and defining feature of Downtown Castle Rock is the multitude of events held in Downtown, with an estimated 80 events per year.



Events such as the Douglas County Fair, Starlighting, Parades, Rodeos, Ducky Derby, and others bring economic boosts for the Town; yet, these events also place additional strain on the roadways and parking infrastructure in Downtown and the surrounding neighborhoods in the form of increased congestion and limited parking availability for visitors.



Events take place in numerous locations including Festival Park (top), on-street (middle), Rink at the Rock (bottom), and many other locations throughout Downtown.





#### **Downtown Growth & Development**

Downtown Castle Rock is experiencing ongoing development that is bringing new and different uses to what was traditionally found. Commercial mixed-use developments are the most common type of development occurring in Downtown; however, recent developments are also introducing residential-based mixed-use projects. This is mostly occurring in the South and Core Districts.

Residential and mixed-use developments have different mobility needs when compared to traditional employment centers:

- Increased Demand for Walking and Bicycling Downtown residential development will increase the demand for walking and bicycling facilities. Limited street right-of-way and a need to improve the Downtown walking and bicycling environment will require trade-offs in the current mobility network.
- New Efficiencies for Residential Travel Patterns Not all new Downtown residents work where they live. Some residents will commute to locations outside of the Downtown area. Additionally, new travel demands, such as residential-based trips to grocery stores, doctor's offices, or schools, will impact the timing and demand of Downtown's mobility network and require a focus on efficiency, including retiming traffic signals.
- Heightened Awareness of Livability Concerns The increasing population of Downtown residents will have a heightened awareness of the relationship between growth, transportation, and livability. Residents have different expectations for transportation investments than employees commuting to and from Downtown. These diverse expectations necessitate strategy solutions that consider wider sidewalks, traffic calming, and community investments, such as landscaping, streetscape improvements, and improved street lighting.

The increase in density, coupled with increasing interest in visiting Downtown, will put additional strain on parking. To combat this, creative mobility solutions, including positioning for transit and improving non-motorized connections into Downtown, will need to be considered and pursued as Downtown evolves. There is the ability to push for a more active transportation network through future development plans that consist of mixed-use development. These developments promote more walkable and bike-friendly areas because there are more amenities provided within walking and bicycling distance, decreasing the need to drive.

The new Riverwalk development and proposed Encore development will more than double the total number of dwelling units in the Downtown area. This could be the start of a trend towards higher density residential and mixed-use buildings in Downtown Castle Rock.







## NEW AND PROPOSED DEVELOPMENTS (2015-2019) IN DOWNTOWN



**Downtown Mobility Master Plan** 

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## **Mobility Framework**

Downtown Castle Rock has mobility goals resulting from past planning objectives, current development and community needs, along with future mobility trends. At times, these mobility demands come into conflict with each other. This can result in accessibility, economic, or quality of life trade-offs for Downtown residents, businesses, visitors, and commuters.

- Downtown's continued growth and increase in economic activity raises property values and elevates the importance of on-street parking. Traditional vehicular mobility improvements that address congestion, such as additional turn lanes at intersections, will become costlier and may hurt Downtown businesses as they need more right-of-way or require the removal of on street parking.
- Increases in residential population and visitors create a need for a more walkable Downtown. Pedestrian improvements will require changes to intersections and the roadway network that create wider sidewalks and more bicycle facilities. To accomplish this, vehicle lane widths may need to be modified or restricted from expanding. Vehicular traffic mobility may be impacted by an improved walking environment.
- The multitude of community events held in the newly renovated Festival Park creates a vibrancy and sense of community that is much desired for Downtown; however, these events put strains on parking and traffic operations, often frustrating commuters.

Given these potential trade-offs, a multi-modal and integrated mobility framework is needed for Downtown Castle Rock that considers the best ways to move people, not just cars, in and around Downtown. Encouraging a mobility environment focused on all modes, including walking, biking, riding transit, and driving, is the most promising way to alleviate current and future transportation challenges. With this as the baseline, the Downtown Mobility Framework will consider the needs of all users of Downtown to provide the highest level of safety, accessibility, livability, and prosperity for this historic yet evolving economic and cultural center of the Town.

This section provides an overview of the various mobility modes and needs within Downtown, identifies gaps and challenges with mobility, and provides recommended strategies that address needs and work towards achieving the Mobility vision for Downtown.





Festival Park is a multi-use gathering destination

Sidewalks are being utilized by businesses for customer seating throughout Downtown





The vast majority of today's transportation systems are dedicated to automobiles

## **Vehicular Mobility**

Currently, the most prominent mode of transportation in and around Downtown Castle Rock is personal vehicles. Vehicular trips include those by employees who work Downtown; visitors who are using Downtown shopping, dining, and entertainment options; residents of Downtown; and freight and deliveries into Downtown. Additionally, there are many motorists who are passing through Downtown to get to their final destination. Each of these trips has different impacts to and different requirements of the Downtown roadway network.







## **Vehicle Congestion and Delay**

The Downtown street network is an interconnected traditional grid north of South Street, while there is not a defined or consistent block structure south of South Street. The major roadways within Downtown are Fifth Street for east-west movement, and Wilcox Street and Perry Street for north-south travel.

A traffic impact analysis was performed to evaluate Downtown intersections and their current and future Level of Service (LOS) during the morning and afternoon peak hours. LOS is a measure of vehicle delay ranging from A (very little delay) to F (long delays and congestion). The acceptable intersection LOS in Castle Rock, as defined by the Town's Transportation Design Criteria Manual, is LOS D for non-turning and right-turn movements, and LOS E for left turn movements.

The analysis for Downtown Castle Rock under current traffic conditions **(bottom left)** shows that all sixteen intersections operate above the Town's minimum acceptable LOS.

A similar LOS analysis was completed for future traffic volumes using the existing roadway and intersection configuration based on traffic growth projections from the Town's Transportation Master Plan (**bottom right**). In this future condition, projected LOS in the afternoon peak period for over half of the analyzed intersections will fall below acceptable levels. Particularly, intersections on Perry Street are anticipated to have difficulty handling the projected increased volumes.

Existing and projected traffic volumes are provided in the Appendix to this report.





## **Vehicle Crashes**

Safety is among the highest priorities and a driving force for considering roadway improvements. Between 2012 and 2017, there were 375 crashes that occurred at key intersections Downtown. There were 11 injury accidents spread throughout these intersections and no fatalities. Five intersections experienced more than 25 crashes over the five-year period. The locations that experience the highest number of crashes were the intersections of major arterials, which carry higher volume and consequently an increased likelihood, of crashes. The Town conducts annual safety audits to statistically test potential contributing factors and explore changes based on these results.







## Vehicular Recommendations

To address future congestion challenges and improve safety throughout Downtown, a series of intersection improvements are recommended that include installation of new roundabouts and new traffic control patterns. Without the recommended improvements by 2040, there are a projected five intersections within Downtown that will operate at LOS F and only four that operate at LOS A. If the recommended improvements are put into place, nine intersections will operate at LOS A.

The Town will also need to consider a corresponding change to it's transportation policies for Downtown in pursuit of the Downtown Mobility Vision and principles to preserve the historic Downtown look and feel and create an accessible and safe environment for people to move around.

# Update the Town's Transportation Design Criteria Manual to accept overall LOS E for Downtown intersections.

This change would impact how intersection performance is evaluated. Without this change, the Town will need to make significant infrastructure investment to

accomodate current LOS standards. For example, to preserve LOS D at the Wilcox Street & Fifth Street intersection, a second southbound left-turn lane would need to be constructed in the future to carry eastbound traffic on Fifth Street across the railroad. Adding an additional lane would require the removal of on-street parking spaces and purchase of additional right-of-way. This future is fiscally infeasible, would create wider streets with faster traffic, and goes against the vision of a lively, pedestrian-oriented Downtown environment.







Pedestrians Survive

Pedestrians Survive

Research completed by the US Department of Transportation Federal Highway Administration (FHWA) shows the correlation between vehicle speed and pedestrian involved crash fatality rates

Pedestrians Survive

# Explore ways to limit vehicular speed to 20 mph for Downtown roadways and 10 mph for alleys.

The combination of Downtown character, land use context, sight line improvements, and others must facilitate a slower speed by motorists. Reducing the speed alone will not significantly improve pedestrian safety.

Recommended improvement impacts and LOS comparisons are available in the Appendix to this report.







#### **RECOMMENDED VEHICULAR IMPROVEMENTS**



#### 4th & Wilcox Intersection Design

This conceptual rendering gives an example for the sidewalk design updates incorporated with a roundabout controlled intersection. The roundabout improves the efficiency and traffic flow in the low speed environment of Downtown. The prominent curb extensions reduce the crossing distance for pedestrians along with improving the visibility of crosswalk users by making them more prominent at the intersection. The design also shows directional crosswalks on each leg of intersection, providing additional pathing clarity over diagonal crosswalks.







#### Sidewalks & Crossings

Gaps in the sidewalk exist in Downtown, most notably along the routes connecting to the Craig and Gould neighborhood. There are also many areas where a sidewalk exists but the width is below the desired 8-foot minimum, or the usable width is much narrower, as shown below.

It was determined that one of the biggest public concerns at crosswalks in Downtown is driver visibility. In some cases, visibility is impeded by landscaping, while there are other locations where signage and crosswalks are located within the intersection where approaching drivers are not able to see them. Additionally, the pedestrian sidewalk ramps within intersections, crossings, and driveways throughout Downtown should be assessed for compliance with the Americans with Disabilities Act (ADA).



# **Pedestrian Mobility**

A critical component of a vibrant Downtown is providing a space where people want to and are able to walk around, visit shops and restaurants, and attend events and gatherings. Castle Rock puts a lot of emphasis on bringing people Downtown for events, with the newly revitalized Festival Park as the cornerstone, although the extent of pedestrian accommodations and walkability varies throughout Downtown.

The map shows where adequate Town right-of-way currently exists to allow for 8-foot sidewalks, as well as locations where there is no sidewalk currently. The mapped results are based on a combination of the existing roadway alignment with property and parcel lines.





#### **Pedestrian Recommendations**

Pedestrian improvements should be incorporated into many aspects of Downtown's growth, ranging from roadway improvements to development and redevelopment opportunities.

As Downtown continues to develop and redevelop, it will be important to leverage opportunites to improve the sidewalks, with a goal of providing at least 8-foot of usable, unobstructed sidewalk in all locations, and a minimum of 10-foot of usable sidewalk for areas that are reconstructed during development. Ideally, the Town can strive for sidwalks beyond the minimum requirements, with a recommended preferred width of 12-foot of usable sidewalk.

In some cases, providing even the 8-foot minimum width will require the Town to recofigure the existing right-of-way. This could be accomplished by increasing the building setback requirements to provide additional sidewalk width, or by reducing the width currently provided to vehicle lanes on the roadway.



Walkway width is impacted by buildings and curb shy which can be occupied by vehicle overhang



**Existing Guidelines** 



**Recommended Minimum** 



**Recommended Preferred** 


#### **Downtown Mobility Master Plan**



**Existing Conditions** 

**Option 1: Alter Setbacks** 

#### Sidewalk Improvements & Right-of-Way Choices

The general opinion of the Town and input from the public is a preference to reduce vehicle lane widths (option 2) to provide additional sidewalk width where it is needed, while still maintaining the angled vehicle parking that is currenlty provided on some roadways. Input at Public Meeting #2 also indicated little support for converting parking to parallel parking, or for providing designated bicycle lanes along key Downtown roadways (see Bicycle Mobility section for recommended bicycle network and associated infrastructure).



Option 2: Reduce Travel Lane Width



**Option 3: Switch Angled to Parallel Parking** 



#### **Downtown Mobility Master Plan**



**Option 2 Example Intersection** 



**Option 3 Example Intersection** 

The Downtown Overlay District and associated Design Guidelines should be updated to include:

- Updated sidewalk guidelines (12-foot preferred width and 10-foot minimum)
- Update intersection design guidelines to the recommended design
- Pedestrian lighting should be consistent throughout Downtown streets and crosswalks
- Remove bicycles from Downtown sidewalks that are not designated as multi-use paths (see bicycle recommendations)

To improve crosswalks and intersections within Downtown, an alternative intersection design standard is recommended that reduces intersection width and makes the crossings more visible. This supports safety and accessibility at intersections. The recommended intersection design (Option 2) would accommodate angled parking while still providing crossing improvements for pedestrians. Another option (3) for improved intersection design was considered that converted angled parking to parallel, and consequently, provided additional road space that could be allocated to other modes such as bicycle lanes. This option was considered less favorable by the Town and the public during Public Workshop #2, as compared to Option 2.





#### 4th & Jerry Curb Extentions

The conceptual below is an illustrative drawing of a potential intersection design with the updated sidewalk standards. Again, this design is showing directional crosswalks and curb extensions that reduce the crossing distance. This intersection design makes the pedestrian more prominent in the intersection which improves visibility and comfort. The added sidewalk width gives space for added beautification and planting beds, as shown in the example from Lawrence, KS.





#### **Downtown Mobility Master Plan**



There are minimal bicycle amenities provided in Downtown, and there were multiple public comments that identified a need for more bicycle amenities, especially secure bicycle parking options.

# **Bicycle Mobility**

The Town's multi-use trails, including the East Plum Creek Trail and the Sellars Gulch Trail, provide access into Downtown at the Police Station, Festival Park, Plum Creek Parkway west of Wilcox Street, and an outlet onto Fair Street.

However, these trails only pass through Downtown. Once in Downtown Castle Rock, there are no designated bicycle routes and minimal facilities that provide a low-stress bicycling environment. On the contrary, many of the roadway facilities in Downtown are actually considered high-stress facilities for bicyclists.





Aesthetically pleasing bicycle parking example found in Castle Rock.



# **Bicycle Recommendations**

To improve bicycle mobility within Downtown, it is recommended that the Town invest both in providing lower-stress bicycle facilities as well as improving bicycle access into Downtown.

A future Downtown bicycle network for Castle Rock should include a network of shared roadways, designated by sharrow pavement markings as shown in the example below, and shared alleys. The alleys identified for the bicycle network should be upgraded so that they have surfaces amenable to bicyclists, such as the example shown from Longmont, CO, but continue to support vehicle traffic such as freight deliveries and alternative access for the Downtown businesses.

These facilities should be complemented by multi-use pathways that are designated routes for bicycles to move throughout Downtown. These paths constist of wider sidewalk or pathway that can accomodate bicycles and pedestrians together.

Proposed bicycle network is shown on the next page.



Shared Roadway (sharrow marking) with Angled Parking Example from Kansas City, KS



Example of Proposed Multi-use Pathway



Existing Alleyway, North of Second Street



Shared Alley Examples from Longmont, CO







#### **BICYCLE INFRASTRUCTURE RECOMMENDATIONS**



At locations where a shared alley is provided, additional attention must be given to make sure alley crossings at roadways are visible and safe for bicyclists. These crossing locations should be outfitted with safety treatments, similar to the mid-block crossing locations within Downtown.

One exception is the crossing location at Fifth Street, where bicyclists should be routed to use an existing intersection crosswalk at either Wilcox or Perry Streets, as opposed to creating a mid-block crossing across Fifth Street. Volumes along Fifth Street make a mid-block crossing location undesirable due to the impacts it would have on bicyclist safety and traffic delay.

In addition to outfitting alleys and implementing new trails, a set of new access points into Downtown from the trail system should be constructed, mainly in the area near East Plum Creek, south of the County building.

Increasing accessibility for bicyclists will help attract more local and out-of-town visitors into Downtown Castle Rock while not concurrently placing additional strain on vehicular parking in Downtown.

By implementing the recommended bicycle facilities on the roadways and alleys, 85% of Downtown will be accessible by a low-stress bicycle facility, more than doubling the current level of accessibility (40%).

# BICYCLE INFRASTRUCTURE COVERAGE COMPARISON







Existing Alley



Active Alley Cross-Section

Note: These renderings are conceptual, specific requirements will be determined in final design

## **IMPROVED ALLEYWAYS**



# Active Alley

An Active Alley is an upgraded alleyway which provides higher quality ammenities. Typically these would include surfacing that is welcoming to pedestrians and bicyclists, increased lighting, ammenities, while providing business access for vehicles.



Active Alley Example Rendering



# **Transit Mobility**

Since the elimination of the Town's fixed route transit service in 2011, Castle Rock has had limited public transportation services available for residents and visitors.

Public Transit, in conjunction with other pedestrian and bicycle enhancements focusing on first and last mile connections, is an important investment to addressing the mobility needs of travelers of all ages and abilities. The Downtown Mobility Community Questionnaire results also showed there may be public interest in expanding the availability of transit options in Downtown Castle Rock as a potential solution to address congestion and parking challenges now, or at least position the Community for it in the future. Based on the 2017 and 2019 Town wide surveys there is support for some transit service, but support drops when these residents are asked for their willingness to pay for the service. Both surveys revealed that less than half of the residents are willing to pay an additional tax to develop a transit system.

# **Regional Transit Service**

In 2018, the Town began to seek opportunities to establish a Bustang transit stop in the I-25 corridor that would provide riders direct access to and from Castle Rock. CDOT Bustang is an interregional express bus service that serves the I-25 and I-70 corridors; the current I-25 corridor connects Colorado Springs to Denver and passes through Castle Rock but does not stop. The closest stops are in Monument and Colorado Station in Denver.

The Town is considering multiple options for locating a Bustang transit stop, including two options being evaluated within the Downtown area.

Northern Downtown: A CDOT-owned lot at the north-end of Downtown adjacent to the I-25 northbound entrance ramp.

Central Downtown: The County Administration Building at the west-end of the Downtown Core District.



Example of Local Transit through downtown Mainstreet from Breckenridge, CO





	Option 1: CDOT Lot	Option 2: County Admin Building
Land Availability <sub>1</sub>	2 CDOT parking lot is available Must purchase gas station for access	County will need to reconfigure their site Must purchase additional property
Connectivity	Poor eastern connectivity for riders	Poor east-west connectivity for riders
Traffic	Some traffic will still be required to travel through Downtown	All traffic would be required to travel through Downtown
Bustang Efficiency <sub>2</sub>	<ul> <li>NB slip ramp allows for high efficiency</li> <li>SB buses may be required to exit freeway to access stop in near-term</li> </ul>	l-25 weaving and right-of-way constraints may limit viability of slip ramps
Cost <sub>2</sub>	<ul> <li>Right-of-way available and cost to build slip ramp is generally low</li> <li>SB ramp will need investment to create a viable passenger loading zone</li> <li>Pedestrian bridge over the freeway required in the long-term</li> </ul>	<ul> <li>Constrained right-of-way would require customized acceleration ramp</li> <li>Requires widening of freeway and reconfiguration of Park St bridge</li> <li>Pedestrian bridge over the freeway required in the long-term</li> </ul>
Future Development₃	<ul> <li>Minimal development potential</li> <li>Limited potential for public-private partnerships</li> </ul>	<ol> <li>High future development potential</li> <li>Good opportunities for public-private partnerships</li> </ol>
Total Score	2 Buctang Location Comparison N	-8 Matrix

This matrix shows an evaluation of the two options for locating a Bustang transit stop within the vicinity of Downtown. The critical factors that impact the feasibility and appropriateness of locating the transit stop are shown on the left in blue. For each of the location options, the score provided is based on the severity of the positive or negative impact that the factor has on the feasibility of implementing the transit stop at that location.

#### Footnotes

1-Kimley-Horn determined in consultation with Douglas County Facilities

2- Kimley-Horn determined in consultation with CDOT

3- Kimley-Horn determined in consultation with the Town of Castle Rock municiple code

#### **Local Transit Circulator**

In addition to introducing Bustang service into Castle Rock to provide better regional transit connectivity, there was public interest in establishing a local circulator within Downtown Castle Rock. This would provide accessibility into Downtown and stop at a few key locations to provide connectivity within Downtown. The initial implementation of this circulator can be used during special events, where the circulator will help bring residents and other visitors into Downtown and can also help alleviate some of the parking challenges that arise during these events by allowing people to park in areas outside of Downtown and take the circulator in. A service like this is currently provided for some events Downtown, and it is recommended that it be expanded to all events and that a more formalized park-and-ride system be implemented.

In the long-term, this local circulator could be expanded to service not only Downtown Castle Rock but also provide regular transit service throughout the Town.







# **Freight and Deliveries**

There are minimal regulations in Castle Rock related to freight movement and deliveries, including in Downtown. The Town's municipal code calls for a universal street design which accommodates all users, including trucks, and there are no designated truck routes. There is no existing signage on Downtown streets to dictate where delivery trucks are or are not allowed to park, and loading and unloading is permitted on all streets, including in residential areas.

There are several different methods that Downtown businesses receive deliveries, depending on where the business is located.

- Businesses along Wilcox Street and Perry Street typically receive deliveries in the alleyways. Depending on the block, these alleyways are accessed from either Wilcox and Perry or from the cross streets.
- Delivery services are also permitted to utilize the cross streets, such as Third or Fourth Streets, to make deliveries if the alleyways are unavailable.
- Nearby parking lots also support unloading of deliveries, if necessary.

While most of the buildings in the Downtown Core District and the North District have access to an alleyway or reasonable side street for deliveries to be made, much of the South District, in its current configuration, does not have access to an alley or side street to support freight deliveries.

This should be coordinated with a future Downtown Curbside Management Plan, discussed on page 44.

As the southern portions of Downtown evolve and redevelop, it is important to develop freight access strategies which do not conflict with street and mobility operations.



Existing alleyway utilized for deliveries.





# **Transportation Demand Management**

The Downtown Mobility Master Plan is a result of the realization that Downtown Castle Rock is changing. New buildings are being constructed, new residents are moving in, and new trends in technologies and generational preferences are emerging. All of this, among other things, is changing how people move in and around Downtown.

An emphasis on managing demand, including parking, is critical to provide a Downtown that aligns with the community and Town vision and accommodates the changes that Downtown Castle Rock is already experiencing.

- As more people live Downtown, accommodating shorter trips, largely through walking and bicycling increase in importance.
- The trend toward a shared economy is changing how we use our existing infrastructure and how we plan for future infrastructure.
- The unknowns related to emerging and future technologies are changing how we are planning for development, capital investments, and the economy.









Services, travel, and deliveries are examples of mobility that will be part of the shared economy





Automobiles were future technology at one point, but are ubiquitous today

# **Future Transportation Technologies**

An impending future of connected vehicles (CV), automated or "driverless" vehicles (AV), shared, and electric vehicles is upon us. Many vehicle manufactures and technology companies are experimenting, testing, and implementing these technologies, although few of these have become widespread in the vehicle market.

The biggest result of the movement towards automation is an increased level of uncertainty in the role that cities and towns need to play in transportation. There are multiple schools of thought on the impacts that automated vehicles will have on local transportation systems, and cities and towns find themselves stuck between accommodating today's demands while trying to plan for tomorrow's unknowns.

Through this uncertainty, agencies in Colorado have made a commitment to staying at the forefront of transportation technology innovation, led by CDOT's RoadX program. This program has committed \$20 million to invest in comprehensive technology solutions to make roadways "crash-free, injury-free, and delay-free". Through this CDOT initiative, public and private sector partners are developing and deploying innovative solutions to local and regional transportation problems. With Downtown being at such close proximity to I-25 and with the current partnership for exploring Bustang transit options in Downtown, it will be important for Castle Rock to consider not only ways that it can play a role in regional technology implementation, but also may want to explore opportunities to partner with other public or private sector companies to explore innovative technology solutions that could help make progress towards the Downtown Mobility Vision.

While there may not be clear answers or a defined way forward, Castle Rock can take some steps towards the future by:

- Plan and design for flexibility in land uses and infrastructure make sure that land and infrastructure can be adapted to best fit the needs of Downtown over time.
- Promote a Downtown that encourages a pedestrian-mindset make Downtown a destination that people come to be pedestrians, regardless of the transportation trend at the time.
- Invest in wayfinding and promotion of businesses make sure that Downtown businesses are visible to potential customers so that mode choice does not impact customers' ability to locate a business.

# What we expect from automated vehicles:

- ▲ Safer and more efficient driving
- Lower car ownership and parking demand
- Lower costs for freight movement and goods
- Increased need for passenger loading zones and reduce demand for parking

#### What we fear:

- Increase in the number of vehicle trips and miles travelled
- Increase in freight trips and truck presence on roadways
- Lower use of alternative transportation modes
- Less "accidental" business discovery due to reduced roadside business exposure



#### **Downtown Mobility Master Plan**



# **Shared Mobility and Curbside Management**

While personal vehicular mobility and privately-owned vehicles still dominate the transportation environment, recent technological advances, coupled with changing values of younger generations, has initiated a trend towards a new model of shared mobility that is quickly gaining traction within Downtown and urban areas. These include car sharing, ridehailing services, such as Uber and Lyft, bicycle and scooter sharing, and other on-demand mobility options.

Many municipalities or entertainment venues are re-thinking their land use and circulation to accommodate the new travel patterns and demands of shared mobility, as the consequences of doing nothing have resulted in greater safety and congestion challenges for both vehicles and pedestrians.

High volume destinations such as hotels, airports, and large event and sports venues, have been the first to create curbside management plans or repurposes and revise parking plans to make sure there is safe and efficient use of existing curb space for passenger pick-up while attempting to avoid intermingling with parking needs and ingress/egress of the site.



In the near-term, Castle Rock will need to put specific effort into examining the various demands on Downtown curbs and the anticipated changes to these demands as Downtown and the general mobility environment grows and evolves. Through development of a Curbside Management Plan, the Town should:

- Identify current and future stresses on curbs, including freight, vehicular, pedestrian, bicycle, and business uses. This will involve outreach to Downtown businesses, current and future residents, visitors, and different Town and County staff to understand the different visions for the use of the curb and how that vision may evolve over time.
- Identify a method to prioritize the various uses, which could change based on factors such as time of day, location, and intended use.
- Consider how the curbside management efforts fit into the larger topic of parking management in Downtown.
- Put forth recommended plans and policies for curbside management, with flexibility for the plans and policies to evolve over time as the Downtown environment and demands change.









# Implementing the DMMP

Just as the vision and framework for the DMMP were driven by multi-departmental input and priorities, realizing the vision through implementation of the DMMP strategies will be a collaborative effort among multiple stakeholders and Town departments.

As a mobility plan, the DMMP does not only look at roads and sidewalks but is instead considering the role of parks, trails, streetlights, store fronts, and the general "look and feel" of Downtown. It is considering the role of current businesses and services and future development in creating the type of Downtown that the community envisions. Consequently, it will take a collective support and continued collaboration from all departments to move the DMMP into reality including:

- Public Works
- Development Services
- Parks and Recreation
- Downtown Development Authority

# Walking & Pedestrian Bicycling Transit Vehicular

The Strategies and Actions are further characterized by these icons, indicating the Transportation Mode that is emphasized.

# **Recommended Strategies and Actions**

There are three categories of strategies and actions recommended by this DMMP that, if implemented, will help Downtown Castle Rock reach is mobility vision and goals.

- Policies
  - Policy recommendations include updates and enhancements to existing policies and standards for Downtown, such as various design standards, development regulations, and permitted uses for different land uses and facilities in Downtown. There are also some suggestions for new policies or standards that look to address some specific challenges, such as providing for the mobility needs of aging and disadvantaged populations, that may be a current or future barrier towards achieving the Downtown Mobility Vision. Many of the policy recommendations are those that can be pursed in the near-term without major costs but that will have important benefits as Downtown continues to grow and develop.
- Studies
  - A set of studies are recommended as a result of the DMMP to provide additional exploration and detail of some key, future investments in Downtown. The DMMP looks to provide guidance towards achieving the Downtown Mobility Vision, but there will need to be some additional exploration by the Town to identify the most effective investment to be made. One example is the development of an Alley Master Plan Downtown. While the DMMP recognizes the opportunities that the alleys can provide for bicycle, pedestrian, and freight movement, a Master Plan will help identify specific design features that the Town would like to pursue for the alleys and more specific details on the specific resources (land, funding, agreements, etc.) that will be needed to implement the desired features.
- Capital Investments
  - Capital investments are specific capital projects that have been identified to address current and future mobility needs of travelers of all ages and abilities in and around Downtown Castle Rock. These projects are categorized into pedestrian, bicycle, vehicle, and transit improvements, although many of the projects have impacts on multiple modes of mobility. These identified capital investments are targeted to provide first and last mile accessibility into and throughout Downtown to better connect people to Town services and destinations.



# **Implementation Phasing**

Each strategy or action is allocated a priority level, which is meant to guide the Town in allocating a level of near-term to implementing the strategy.

*High Priority* strategies are those that are recommended for implementation as soon as feasible. High priority strategies include those that:

- Represent critical efforts that must be completed before other strategies are pursued, and thus should be implemented at their earliest convenience.
- Require minimal or no effort or funding to implement, and thus are considered 'low hanging fruit' that would have immediate impacts towards pursuing the Downtown Mobility Vision
- Address high priority topics or initiatives as identify by Town management, elected officials, and/or the public.

*Medium Priority* strategies are those that are recommended to be programmed for implementation within 10 years because of the following factors:

- May require a higher level of effort and/or funding to implement than high priority projects, so it may take time to plan, gather resources (partnerships, funding, land/right-of-way), and program the implementation of the strategy
- May not be required until certain conditions arise in Downtown. For example, some intersection improvement projects are identified to address future projected traffic volumes along specific roadways. These changes are not necessary based on current conditions, and thus should not be implemented until the conditions arise that warrant the strategy.
- May be dependent on the implementation of a High Priority strategy, and thus will not be effective or feasible until high priority strategies are in place.

*Low Priority* strategies are those that are recommend being programmed for implementation 10 or more years in the future. This recommendation may be a result of the following factors:

- May require a significant level of effort and/or funding to implement, so it may take time to plan and gather resources, create partnerships, or secure/program for funding.
- May not be required until certain conditions arise in Downtown. For example, some intersection improvement projects are identified to address future projected traffic volumes along specific roadways. These changes are not necessary based on current conditions, and thus should not be implemented until the conditions arise that warrant the strategy.
- May be dependent on the implementation of a Medium Priority strategy, and thus will not be effective or feasible until those strategies are in place.

For both medium and low priority strategy, prior to taking any steps towards implementing the strategy, the Town should reevaluate the strategy to make sure: 1) the strategy is still relevant, given the outcomes of high priority strategies and the conditions in Downtown; 2) the strategy is still aligned with the vision and priorities of the Town, its decision makers, and the public.



# **Strategy Costs**

A relative or planning-level cost for each of the recommended strategies is provided in the Strategy table based on the following convention:

- 🔺 \$ Less than \$50,000
- ▲ \$\$ Between \$50,000 and \$100,000
- ▲ \$\$\$ Between \$100,000 and \$250,000
- ▲ \$\$\$\$ Between \$250,000 and \$500,000
- \$\$\$\$\$ Between \$500,000 and \$1 million
- \$\$\$\$\$\$ More than \$1 million

Cost ranges, based upon 2019 dolars, were used for most of the capital projects, as there is a large variability in project costs that can only be specified by engineering study. Other factors that may impact project costs are inflation (depending on when the project is ultimately programmed for implementation), the cost for right-of-way (if necessary), and additional costs that might be incurred for administering the project, depending on the funding source used. Because of these and other unknowns, the cost ranges should be used by the Town to identify costs for performing preliminary engineering on these projects, and through those efforts, a more complete and final design and construction cost can be identified.

There are some strategies where more specific cost estimates are provided, which provided for recommended studies and for projects that are similar to ones that the Town recently completed, and thus could be extrapolated to some level of confidence by the Town. There are also some strategies, mainly policy changes, that will not have a financial cost, but will require staff time and effort to complete.



# **Implementation Strategies & Actions**

Mada	Strategy/	Description	Cost	Priority		
woue	Action		COSI	High	Med	Low
		POLICIES				
Ŕ	Update Downtown Sidewalk Standards	Increase the Downtown sidewalk standard from an 8' minimum to a 10' minimum (with minimum 6' Pedestrian Clear Zone) on Fifth Street, Wilcox Street, and Perry Street and a 12' minimum (with minimum 6' Pedestrian Clear Zone) on all remaining and future streets in Downtown. This will require modification of existing curb locations. Concurrently, update Downtown landscaping standards so that they complement minimum sidewalk widths.	N/A	x		
<b>*</b>	Update Downtown Lighting Standards	Public streets, including sidewalks, should have a uniformity ratio of 3:1, with a minimum average of 4.1, foot-candles at intersections, and crosswalks, and a minimum average 2.7 foot-candle between intersections.	N/A		x	
Ŕ	Establish Downtown Sidewalk Use Regulations	Disallow bicycles, standing scooters, skateboards, and other mechanized travel modes capable of exceeding 5 mph, from sidewalks not designated at multi-use pathways (once identified bicycle and alley improvements are implemented).	N/A		x	
Ť	Public Bicycle Parking Policies	As part of the updated sidewalk standards, incorporate public bicycle parking areas on each street corner. On-street bike corrals should be considered where sidewalk is constrained. Long term bike parking (e.g. bike lockers) should be considered within public parking structures and other public space. Include bicycle parking considerations during future projects, including curb-side management program (for dock- less bicycles), and proposed intersection/alley improvements.	N/A	х		
	Update Transportation Design Criteria Manual	<ul> <li>Update the Transportation Design Criteria Manual:</li> <li>Allow overall LOS E for Downtown intersections</li> <li>Explore ways to limit vehicular speed to 20 mph on Downtown roadways and 10 mph on shared alleys.</li> </ul>	N/A	х		
	Downtown Redevelopment Planning	Establish a policy for future development that enables implementation of an interconnected network of streets or private drives as part of redevelopment south of South Street to improve access and circulation.	N/A	х		
Ż	ADA Curb Ramp Standards	Update ADA design standards for Downtown to construct directional curb ramps when current ramps are reconstructed, either by the Town or through redevelopment.	N/A	x		
<b>*</b>	Handicap Parking Distribution	In conjunction with updated sidewalk standard, establish a policy to redistribute on-street handicap parking stalls throughout Downtown with a goal to install one space per block perimeter. These improvements should be completed as part of any sidewalk reconstruction that occurs.	N/A	х		



Mode	Strategy/	Description	Cost	Priority		
widue	Action	Description	CUSI	High	Med	Low
		STUDIES				
<b>*</b>	Downtown Alley Master Plan	Create a Downtown Alley Master Plan to guide redevelopment efforts and improvements of the Downtown alley network. The Plan will consider the design and amenity needs for each proposed section of improved alley and provide a cost estimate for construction.	\$200,000	х		
	Downtown Wayfinding Program	Develop a Downtown Integrated Wayfinding Sign Program for vehicles, bicycles, and pedestrians to support a hierarchy of wayfinding in Downtown, from large-scale gateways to smaller scale amenities.	\$75,000		x	
Ŕ	Downtown Sidewalk and Streetscape Design Manual	Develop a Downtown Sidewalk and Streetscape Design Manual that references updated sidewalk standards and updated streetscape standards. The Manual should consider an implementation strategy and private development requirements for implementing the new standards.	\$125,000	х		
	Curbside Management Plan	As transportation technology changes and evolves, develop curb-side management plan for multimodal improvements to accommodate changing land uses and associated parking demands, freight delivery and access needs, and the evolving shared economy (e.g. valet parking, drop off and pick up locations, delivery locations). This should occur after new sidewalk standards is finalized and should reference the Downtown Parking Master Plan	\$50,000			х
Ŕ	ADA Transition Plan for Downtown	Conduct a walking audit of Downtown to examine and document ADA compliance along sidewalks, driveways, alleys, and other public facilities, such as parking garages, parks, and government buildings. Develop an ADA Transition Plan that outlines a plan to address ADA challenges over time.	\$165,000	х		
<b>4</b> 0	Shared Bike Programs	Explore shared bike programs with private companies that would offer and manage the service in the Downtown area	N/A		х	
	I-25, Wilcox Street & Wolfensberger Road Intersection and Roadway Improvements	Based on the outcomes of the Transit Feasibility Study, coordinate with CDOT to complete a preliminary engineering design for improvements at the I-25/Wolfensberger ramp intersections. Encourage an intersection design that improves safety and access to the CDOT excess right-of-way parcel north of the NB ramp intersection. Design should allow for the potential Bustang park-n-ride, or public carpool parking lot.	\$480,000	Х		
40 \$	Front Street Trail Extension Route Alternatives Study	Develop feasibility study to explore options to extend the Front Street Trail from Fifth Street to Second Street and ultimately Festival Park on the west side of the UPRR corridor or east side using Town of Castle Rock right-of-way.	\$20,000	х		



Modo	Strategy/	Description		Priority		
woue	Action	Description	COSL	High	Med	Low
		CAPITAL INVESTMENTS				
	Roundabout at Wilcox & Fourth Intersection	Design and construct single-lane roundabout. This improvement should be made in coordination with recommended curb-extensions and pedestrian improvements.	\$1.2 million		x	
	Lane/Signal Timing Modification Wilcox & Third	Restripe to extend EB & WB left turn storage lane. Adjust left turn phase at traffic signal when conditions warrant.	\$\$\$	x		
*	Roundabout at Wilcox & South St Intersection	Implement single-lane roundabout. This improvement should be made in coordination with recommended curb-extensions and pedestrian improvements	\$1.9 million		х	
	Wilcox & Plum Creek Pkwy Intersection and Operations Upgrades	Restrict eastbound U-turn, adjust traffic signal timing for southbound right turn overlap phase, and construct a 175- foot right turn lane.	\$\$\$	х		
*	Roundabout at Jerry & Fifth	Implement single-lane roundabout. This improvement should be made in coordination with recommended curb-extensions and pedestrian improvements	\$1.9 million		Х	
	Restrict Access at Perry & Sixth	Restrict eastbound and westbound left turns and through movements to create ¾ access via a median barrier and signage	\$\$	х		
	Roundabout at Perry & Fourth	Design and construct single-lane roundabout	\$1.2 million		х	
	Roundabout at Perry & Second	Design and construct single-lane roundabout	\$1.2 million		х	
	Total Vehi	cular Capital Investments Planning Level Cost Estima	ıte: \$8,00	0,000		



Mode	Strategy/	Description	Cost	Priority		,
IVIOUE	Action	Description	COSC	High	Med	Low
		Pedestrian				
六	Perry Street Minor Intersection Safety Projects	Modify landscaping to improve pedestrian visibility and vehicular sightlines along Perry Street at the Second Street, Third Street, and Fourth Street intersections.	\$20,000	х		
숬	Wilcox and Eighth Intersection Curb Extensions	Improve pedestrian visibility and vehicular sightlines by constructing curb extensions.	\$\$\$	\$		
Ķ	Wilcox Midblock Crosswalk between Eighth and Seventh	Improve pedestrian mobility by constructing a midblock crosswalk near 723 Wilcox Street to maintain 300-foot crossing distances in Downtown. The crosswalk should include an RRFB and curb extensions for safety.	\$\$\$		х	
Ż	Wilcox and Seventh Intersection Curb Extensions	Improve pedestrian visibility and vehicular sightlines by constructing a curb extension on the west side of the intersection.	\$\$\$		х	
六	Wilcox and Sixth Intersection Curb extensions	Improve pedestrian visibility and vehicular sightlines by constructing a curb extension on the northwest corner and ensure landscaping does not create visibility issues.	\$\$\$\$\$		х	
Ż	Improve Wilcox Sidewalk and ADA Access Between Third and Fourth	Widen sidewalk in front of businesses along east side of Wilcox by converting angled on-street parking to parallel on-street parking, and construct new angled on-street parking along the west side of the street. The sidewalk can then be widened to accommodate new ADA access to businesses and construct outdoor dining and merchandise display areas.	\$\$\$			Х
٥ <sup>7</sup> 0 \$	Enhanced Pedestrian Crossing at Wilcox and Second	Install an enhanced pedestrian crossing at Wilcox Street and Second Street with color concrete to match Festival Park and a rapid flashing rectangular beacon (RRFB) or High-intensity Activated CrossWalK (HAWK). Consider enhancing the center median as a pedestrian refuge island.	\$\$	х		
Ŕ	Jerry and Fourth Intersection Curb extensions	Improve pedestrian visibility and vehicular sightlines by constructing curb extensions.	\$\$\$\$\$		Х	
六	Jerry and Third Intersection Curb extensions	Improve pedestrian visibility and vehicular sightlines by constructing curb extensions.	\$\$\$	х		
¢	Construct Sidewalks to Complete Pedestrian Network	<ul> <li>Construct missing sidewalks along the following streets:</li> <li>Wilcox – east side of street, north of 810 N. Wilcox to Wolfensberger Road</li> <li>Jerry – east side of street, north of 6th Street to Wilcox</li> <li>Perry – west side of street, south of South Street to Miller Court</li> <li>2nd Street – north and south side of street across UPRR</li> <li>3rd Street – north and south side of street across UPRR</li> <li>5th Street – south side of street from Jerry St. west to alley</li> <li>Phelps – north side of street along 2 Phelps Street</li> </ul>	\$\$\$\$		X	
	Total Pede	strian Capital Investments Planning Level Cost Estim	ate: \$3,87	70,000		



Mada	Strategy/	Description		Priority		
wode	Action	Description	Cost	High	Med	Low
		Bicycle				
Ă	Sharrow Streets	<ul> <li>The following streets should be painted with share the road "sharrows" to improve east/west bike connectivity:</li> <li>Phelps Street</li> <li>South Street</li> <li>Fourth Street</li> <li>Sixth Street</li> </ul>	\$10,000 Annually	Х		
্য হ	Shared Alley (Northern Section)	Redesign the alleyway between Wilcox Street and Perry Street from Fifth Street to Eighth Street to become a shared alleyway and prominent urban design investment for improved bicycle and pedestrian mobility and economic development. The alley will become the primary north/ south movement for bicycles, connecting Festival Park to the remaining portions of Downtown. Improve mid-block street crossings for all cross streets except Fifth Street, where Wilcox and Perry Street will provide the bicycle and pedestrian crossing. As alleyways are improved look at using the IREA franchise fee to bury overhead power lines.	\$730,000 per block est.			Х
ক হ হ	Shared Alley (Central Section)	Redesign the alleyway between Wilcox Street and Perry Street from Second Street to Fifth Street to become a shared alleyway and prominent urban design investment for improved bicycle and pedestrian mobility and economic development. The alley will become the primary north/ south movement for bicycles, connecting Festival Park to the remaining portions of Downtown. Improve mid-block street crossings for all cross streets except Fifth Street, where Wilcox and Perry Street will provide the bicycle and pedestrian crossing. As alleyways are improved look at using the IREA franchise fee to bury overhead power lines.	\$730,000 per block		х	
₫ * *	Shared Alley (Southwest Section)	Design and implement a shared use alleyway between First Street and Briscoe Street. The alleyway should be designed as a shared use space between pedestrian, bicyclists, and vehicles. Vehicle access to adjacent businesses and residences is especially important during Downtown events when Wilcox Street may be closed. As alleyways are improved look at using the IREA franchise fee to bury overhead power lines.	\$730,000 per block		х	
۵۲ ۲	Wilcox Southern Bicycle Connection	Upgrade sidewalk on west side of Wilcox between Briscoe Street and Plum Creek Parkway to a multi-use path that provides a connection between the Southwest shared alley and the proposed trail on Plum Creek Parkway	\$\$\$			х
হ হ	Industrial Tributary Trail	Construct trail from Philip S. Miller Park to East Plum Creek and Park Street/Fifth Street along Industrial Tributary and Fifth Street to Jerry Street (approx. 1.0 miles) Western Connection	\$\$\$		x	



Mada	Strategy/			Priority			
widde	Action	Description	COSC	High	Med	Low	
		<b>Bicycle</b> (continued)					
С Х	Front Street Trail Extension Route Alternative	Based on results of feasibility study, extend the Front Street Trail from Fifth Street to Second Street and ultimately Festival Park.	\$\$\$\$		х		
ATO T	Fifth Street Trail Connection	Improve sidewalks on each side of Fifth Street to multi-use pathways that can accommodate bicycles between Jerry Street and the existing Front Street trail east of Downtown	\$\$\$\$		х		
۵۴۵ ۲	Jerry Street Bicycle Route – Fifth to Second Street	Implement sharrow pavement markings and shared roadway signage from Fifth Street to Third Street to establish a shared roadway for bicycles and vehicles. Create connection between Jerry Street bicycle facility/alley and East Plum Creek Trail/Sellers Gulch Trail	\$\$	х			
₫ \$	Jerry Street Bicycle Route – Fifth to Eighth Street	Evaluate and establish a bicycle facility along Jerry Street between Fifth Street and Eighth Street. This plan identified a multi-use path as the recommended facility.	\$\$\$		х		
₫ \$	South Street Bicycle Connections	Establish formal connection between South Street and Seller's Gulch Trail by constructing a multi-use pathway and a bridge over Seller's Gulch Creek.	\$\$\$		х		
đ	First Street Bicycle Route	Establish multi-use pathway along First Street to provide access to Plum Creek Trail and connect it to Wilcox Street.	\$\$	Х			
	Total Bic	ycle Capital Investments Planning Level Cost Estimat	e: \$4,400	,000			
		Transit					
₫ \$	Event-Specific Transportation Amenities	Develop a special event shuttle service through partnerships for the Downtown and Douglas County Fairgrounds, connecting remote parking areas throughout Town to the event. The frequency of the service should be convenient to the users and may require more than one shuttle. Provide a bike corral at all special events.	\$\$\$\$	Х			
	Bustang Service / Carpool Parking Lot	CDOT is exploring possible sites for both an interim and permanent location for a transit stop in Castle Rock. If a Downtown location is considered, this plan recommends the use of the existing CDOT excess right-of-way property located adjacent to I-25, north of the Wolfensberger Road and Wilcox Street. However, if a Downtown location is not selected for a Bustang stop the excess right-of-way parcel should be used as a carpool parking lot or downtown parking.	TBD	X			





DDA Mid-Block Pedestrian Crossing Example



2019 Town Pavement Maintenance Program

# Implementation Partners and Funding Opportunities

In addition to the multi-departmental partnerships that will be needed to implement the DMMP, the Town will also need to collaborate with other local and regional partners to effectively and efficiently implement strategies to realize the Downtown Mobility Vision.

### **Town Funding Opportunities**

- Castle Rock Downtown Development Authority (DDA) The Downtown Development Authority (DDA) is a quasi-municipal corporation, authorized by the Castle Rock Town Council The DDA is responsible for adopting and implementing the plan of development for Downtown Castle Rock and works to facilitate economic development and the redevelopment of properties and infrastructure within the downtown area. Example transportation projects sponsored by the DDA include the mid-block pedestrian crossing located throughout Downtown.
- Town of Castle Rock Funds For each fiscal year, the Town adopts a budget that identifies specific funding that is allocated for projects and annual operations. The budget is allocated to governmental funds and proprietary funds that include:
  - Transportation Fund supports the construction, acquisition, installation, repair and maintenance of streets, bridges, and sidewalks. Also counts for acquisition of easements and right-of-way, development of transportation facilities, and for the operations of the Public Works department, which is responsible for the construction and maintenance of public transportation facilities.
  - ▲ DDA Tax Increment Financing (TIF) Funds –Tax Increment Financing (TIF) capture increases in sales and property taxes in Downtown. The Town of Castle Rock may issue bonds, which are repaid by the TIF, to pay for any project described in the DDA's Plan of Development, including transportation improvements. With approval of the DDA's qualified electors, the Town Council may also levy an additional property tax of up to 5 mills on the properties within the DDA boundaries. Currently, this mill levy has been authorized at 3 mills.
  - Parks and Recreation Capital Fund construction, expansion, and improvement of Town parks and trails. The primary source of revenue for this fund is from development impact fees collected as part of building permits.
  - Transportation Capital Projects Funds resources and expenditures for the construction of new transportation projects which accommodate the growth in the Castle Rock area.
- Town Revenue Sources for Transportation Investments The Town generates revenue through a set of voter-approved taxes and fees, with all revenue being invested back into Town services and projects. These includes sales tax, impact fees and system development fees, building use taxes, motor vehicle taxes, and others. More than 36% of the 2019 revenue is allocated to transportation, and another almost 33% is allocated to transportation capital projects.
  - ▲ Sales Tax Just under 25% of sales tax for 2019 is allocated for transportation
  - ▲ Motor Vehicle Taxes 33% of motor vehicle taxes go to transportation
  - Highway User Tax Collected by the state and distributed to local agencies based on their local share of users and roadways for construction, maintenance or improvement of streets, roads, and highways. The Highway User tax accounts for 10.5% of the Transportation Fund.
  - Development impact fees and system development fees make up more than 16% of Town revenue and are used to meet infrastructure needs caused by growth (roads, parks, trails, etc.).



#### **DRCOG Transportation Improvement Program (TIP)**

The TIP is a 5-year, fiscally constrained program of projects that will be implemented using federal funds allocated to the Denver region. As the Municipal Planning Organization (MPO) for the Denver metro area, DRCOG is responsible for allocating and programming the federal funding through preparation of the TIP in cooperation with local governments. The current TIP provides a program of projects for FY 2016 – 2021.

Local agencies submit project applications in one of eight categories – roadway capacity projects, roadway operational improvement projects, roadway reconstruction projects, transit passenger facilities projects, transit service projects, bicycle/ pedestrian projects, other enhancement projects, and transportation studies. Project applications are evaluated, scored, and ranked, with the highest ranked projects being included in the TIP for a specific funding year based on funding availability. Any project included in the TIP requires a 20% local match to be provided by the sponsoring agency.

The TIP is a potential source of funding that Castle Rock can try to leverage to implement DMMP strategies, however, because the TIP is allocated through FY 2021, TIP funding will not be available until FY 2022 at the earliest. As such, TIP funding may not be the appropriate source of funding for high priority projects in the DMMP that are recommended for more near-term implementation.

#### **Public Private Partnerships (PPP)**

Many of the strategies recommended in the DMMP will be driven by redevelopment efforts in Downtown, including upgrades to sidewalks, intersections, and the allies. Before improvements through redevelopment can become a reality, the Town must update their development and design standards for elements such as sidewalks, streetscape, parking (bicycle and vehicle), and others identified in the DMMP recommendations. With these in place, as Downtown parcels redevelop, they will be required to upgrade the adjacent public facilities to meet the current standards. In areas where redevelopment will not be catalyst for making the updates, the Town may decide to advance the projects it self.

In some cases, the Town may look to collect an in-lieu fee from development for some improvements through the identification of improvement districts. This is done in the cases of intersection improvements or crossings, where a development is assessed a fee proportional to the costs for their share of the intersection. In these cases, the Town would collect a fee in-lieu of the improvement so that it can then collect the reminder of the funds needed to complete the whole project, either through other in-lieu fees assessed to different developments, or through Town funds.

Partnering with private sector companies may be a viable way to accomplish some of the DMMP strategies, especially those that include technology. Examples may include:

- Transit shuttle: The Town already partners with a private company to provide the taxi voucher program and Senior Center shuttle service, so a similar type of partnership could be used to provide the Downtown circulator that is called for in this DMMP.
- Micromobility: To provide micromobility options such as bike sharing, the Town will need to partner with these providers to bring their service to Downtown under a specific contract agreed upon by both parties.





Example Castle Rock TIP Project from 2018- 2021 Approved TIP



Castle Rock FreeCycle Bike Share Program, Partnered with Castle Rock Adventist Hospital

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CASTLE ROCK DOWNTOWN MOBILITY STUDY EXISTING LANE CONFIGURATIONS AND CONTROL



FIGURE 1





# CASTLE ROCK DOWNTOWN MOBILITY STUDY EXISTING TRAFFIC VOLUMES



CASTLE ROCK DOWNTOWN MOBILITY STUDY EXISTING PEDESTRIAN AND BICYCLE VOLUMES









# CASTLE ROCK DOWNTOWN MOBILITY STUDY 2040 PEDESTRIAN AND BICYCLE VOLUMES



		Existing		Year	2030	Year 2040	
Intersection	Movement	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
		LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)
I-25 SB & Wolfensberger	Overall	18.4	21.1	18.3	22.6	27.1	33.5
Rd (#1)		B	C	B	C	C	C
I-25 NB & Wilcox St (#2)	Overall	10.3 B	6.2 A	16.1 B	7.6 A	17.8 B	21.8 C
Sixth St & Wilcox St (#3)	Overall	7.2 A	10.8 B	9.1 A	13.2 B	10.1 B	18.8 B
	Northbound	8.2	8.8	8.5	9.2	8.9	10.1
	Left	A	A	A	A	A	B
STOP	Eastbound	17.3	28.5	23.6	61.2	33.2	472.5
	Approach	C	D	C	F	D	F
Sixth St & Perry St (#4)	Westbound	10.7	13.8	10.6	15.3	11.6	24.4
	Approach	B	B	B	C	B	C
	Southbound	7.7	8.2	7.8	8.3	7.9	8.8
	Left	A	A	A	A	A	A
STOP	Northbound	16.8	22.3	16.3	22.4	20.7	47.3
	Approach	C	C	C	C	C	E
Fifth St & Jerry St (#5)	Eastbound	8.0	7.9	8.0	8.0	8.2	8.4
	Approach	A	A	A	A	A	A
	Westbound Left	8.2 A	8.1 A	8.1 A	8.1 A	8.4 A	8.5 A
STOP	Southbound	16.9	20.2	15.9	22.2	19.4	46.3
	Approach	C	C	C	C	C	E
Fifth St & Wilcox St (#6)	Overall	19.8 B	24.0 C	19.6 B	32.2 C	18.0 C	71.9 E
Fifth St & Perry St (#7)	Overall	24.9 C	23.9 C	24.2 C	25.1 C	23.8 C	58.1 E
	Northbound	8.2	8.5	8.2	8.8	8.4	9.5
	Left	A	A	A	A	A	A
STOP	Eastbound Left	0.0 A	30.9 D	0.0 A	40.7 E	0.0 A	104.4 F
Fourth St & Wilcox St (#8)	Eastbound	10.5	16.2	10.5	17.6	11.1	25.7
	Through	B	C	B	C	B	D
	Westbound Left	16.7 C	29.3 D	17.4 C	36.5 E	21.2 C	72.1 F
	Westbound	11.3	15.9	11.1	17.7	12.2	25.6
	Through	B	C	B	C	B	D
	Southbound	7.9	8.5	8.0	8.6	8.2	9.2
	Left	A	A	A	A	A	A

#### Table 1 – Study Area Intersections LOS Results

		Existing		Year	2030	Year 2040		
Intersection	Movement	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	
		LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	LOS (Delay)	
	Northbound	7.9	8.2	7.9	8.3	8.1	8.8	
	Left	A	A	A	A	A	A	
	Eastbound Left	15.2 C	24.2 C	15.5 C	27.7 D	19.5 C	56.1 F	
Fourth St & Perry St (#9)	Eastbound	11.7	12.7	13.6	17.3	15.3	22.0	
	Through	B	B	B	C	C	C	
STOP	Westbound	11.8	16.9	11.3	18.0	11.9	26.0	
	Approach	B	C	B	C	B	D	
	Southbound	7.7	8.3	7.8	8.5	8.1	9.0	
	Left	A	A	A	A	A	A	
Third St & Wilcox St (#10)	Overall	6.9 A	10.8 B	7.5 A	9.8 A	7.6 A	11.2 B	
Third St & Perry St (#11)	Overall	5.9 A	10.4 B	5.9 A	10.8 B	6.9 A	16.6 C	
	Northbound	7.6	8.1	7.6	8.2	7.8	8.7	
	Left	A	A	A	A	A	A	
Perry St & Second St (#12) STOP	Westbound Left	13.1 B	23.6 C	13.2 B	26.6 D	15.8 C	61.6 F	
ALL WAY	Westbound	9.9	12.0	9.9	12.1	10.5	13.9	
	Approach	A	B	A	B	B	B	
	Southbound	7.9	8.7	7.9	8.8	8.1	9.5	
	Left	A	A	A	A	A	A	
	Northbound	7.7	8.6	7.9	9.1	8.1	9.9	
	Left	A	A	A	A	A	A	
STOP	Eastbound	14.2	18.8	16.2	27.0	18.3	52.0	
	Approach	B	C	C	D	C	F	
South St & Wilcox St (#13)	Westbound	15.3	19.2	18.5	34.4	23.2	134.8	
	Approach	C	C	C	D	C	F	
	Southbound	8.3	8.2	8.4	8.6	8.6	9.2	
	Left	A	A	A	A	A	A	
	Northbound	7.8	8.2	7.8	8.3	7.9	8.9	
	Left	A	A	A	A	A	A	
South St & Perry St (#14)	Eastbound	11.4	17.1	11.6	19.2	12.8	36.4	
	Approach	B	C	B	C	B	E	
Plum Creek Parkway & Vilcox St (#15)	Overall	17.9 B	22.0 C	20.5 C	25.5 C	31.8 C	38.0 D	
Plum Creek Parkway & Perry St (#16)	Overall	17.9 B	24.7 C	15.2 B	28.7 C	21.5 C	34.5 C	
	Existing Turn Lane	2030 Calculated Queue	2030 Recommended	2040 Calculated Queue	2040 Recommended			
---	-----------------------	-----------------------------	---------------------	-----------------------------	---------------------	--		
Intersection Turn Lane	Length (feet)	(feet)	Length (feet)	(feet)	Length (feet)			
I-25 SB On Ramp & Wolfensberger Rd (#1)								
Eastbound Right	С	-	С	-	С			
Westbound Left	200'	41'	200'	52'	200'			
Southbound Left	125'	161'	175'	213'	225'			
Southbound Right	125'	-	125'	-	125'			
L25 & Wilcox St (#2)								
Easthound Left	250'	126'	250'	220'	250'			
Westbound Right	250'	30'	250'	42'	250'			
Sixth St & Wilcox St (#2)	200		230	72	200			
Sixth Si & Wilcox Si (#3)	50'	26'	E0'	40'	F0'			
Easibound Left	50 25'	30	50 35'	48	00 25'			
Westbound Left	30	20	30	25	30 100'			
Northbound Left	100	25	100	25 77	100			
Southbound Left	50	45	50	11	100			
Sixth St & Perry St (#4)								
Northbound Left	60'	25'	60'	25'	60'			
Southbound Left	70'	25'	70'	25'	70'			
Fifth St & Jerry St (#5)								
Westbound Left	85'	25'	85'	25'	85'			
Fifth St & Wilcox St (#6)								
Eastbound Left	100'	41'	100'	62'	100'			
Westbound Left	125'	167'	175'	330'	325'			
Westbound Right	100'	25'	100'	40'	100'			
Northbound Left	75'	51'	75'	57'	75'			
Northbound Right	50'	73'	75'	84'	100'			
Southbound Left	125'	582'	<mark>600'</mark>	796'	800'			
Fifth St & Perry St (#7)								
Eastbound Left	125'	72'	125'	59'	125'			
Eastbound Right	100'	25'	100'	25'	100'			
Westbound Left	125'	53'	125'	78'	125'			
Northbound Left	150'	47'	150'	59'	150'			
Northbound Right	150'	29'	150'	80'	150'			
Southbound Left	125'	58'	125'	90'	125'			
Southbound Right	125'	47'	125'	111'	125'			
Fourth St & Wilcox St (#8)								
Easthound Left	50'	25'	50'	48'	50'			
Westbound Left	50'	25'	50'	40 25'	50'			
Northbound Left	100'	25'	100'	25'	100'			
Southbound Left	100'	25'	100'	25'	100'			
	100	25	100	25	100			
Fourth St & Ferry St (#9)	50'	25'	50'	22'	50'			
Eastbound Left	50 100'	25	50 100'	33 25'	50 100'			
Southbound Left	100	25	100	25	100			
	100	20	100	20	100			
I hird St & Wilcox St (#10)	501	4001	4051	40.01	450			
Eastbound Left	50'	103	125	130	150			
Westbound Left	50	53	75 50	61	75 50'			
Northbound Left	50'	20'	50'	27	50'			
	100	23	100	30	100			
Third St & Perry St (#11)								
Eastbound	50'	35'	50'	58'	75'			
vv estbound	50'	25'	50'	35'	50'			
Northbound	100'	100'	100'	205'	200'			
Southbound	100'	68'	100'	140'	150'			
Second St & Perry St (#12)								
Westbound Left	65'	25'	65'	68'	75'			
Southbound Left	125'	25'	125'	25'	125'			
South St & Wilcox St (#13)								
Northbound Left	135' TWLTL	25'	135' TWLTL	25'	135' TWLTL			
Southbound Left	285' TWLTL	25'	285' TWLTL	25'	285' TWLTL			

Table 2 – Turn Lane Queue Length Analysis Results
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Intersection Turn Lane	Existing Turn Lane Length (feet)	2030 Calculated Queue (feet)	2030 Recommended Length (feet)	2040 Calculated Queue (feet)	2040 Recommended Lenath (feet)
South St & Perry St (#14)					
Northbound Left	135'	25'	135'	25'	135'
Plum Creek Pkwy & Wilcox St (#15)					
Eastbound Left	300'	182'	300'	291'	300'
Eastbound Right	275'	53'	275'	202'	275'
Westbound Left	200'	38'	200'	42'	200'
Westbound Right	150'	25'	150'	35'	150'
Northbound Left	200'	162'	200'	254'	250'
Northbound Right	200'	34'	200'	54'	200'
Southbound Left	150'	191'	200'	345'	350'
Southbound Right	150'	91'	150'	99'	150'
Plum Creek Pkwy & Perry St (#16)					
Eastbound Left	175'	93'	175'	137'	175'
Eastbound Right	100'	25'	100'	25'	100'
Westbound Left	100'	93'	100'	126'	125'
Northbound Left	200'	184'	200'	380'	400'
Northbound Right	200'	58'	200'	85'	200'
Southbound Left	150'	119'	150'	245'	250'
Southbound Right	150'	55'	150'	55'	150'

C = Continuous Turn Lane; TWLTL = Two Way Left Turn Lane; FREE = Free Flow Right Turn Lane





LEGEND X Study Area Key Intersection Stop Controlled Approach Signalized Intersection A Roundabout Control \* Turn Lane Extension Constraint Improvements 100' Turn Lane Length (feet) FIGURE 7

Kimley »Horn



Turn Lane Extension Constraint Improvements —100'Turn Lane Length (feet) FIGURE 8

**Kimley**»Hor

				Year	2030
Intersection	Improvement	Control	Movement	AM Peak Hour	PM Peak Hour
		ot Overa		LOS (Delay)	LOS (Delay)
I-25 SB & Wolfensberger Rd (#1)	- 3 EB Thru Lanes (From 4) - 2 WB Thru Lanes (From 1)	8	Overall	22.1 C	23.2 C
I-25 NB & Wilcox St (#2)	- Roundabout - New Leg to CDOT Property for Bustang Lot	$\Diamond$	Overall	14.8 B	7.9 A
			Northbound Left	8.5 A	9.2 A
Sixth St & Perry St (#4)	Restrict Eastbound and	STOP STOP	Eastbound Right	10.5 B	12.9 B
	ion Improvement Control Movement $A^{AM}_{Peak}$ $A^{M}_{Peak}$ $A$		Westbound Right	10.3 B	13.0 B
		8.5 A			
Fourth St & Wilcox St (#8)	Single Lane Roundabout	$\Diamond$	Overall	6.6 A	10.3 B
South St & Wilcox St (#13)	Single Lane Roundabout	$\Diamond$	Overall	6.9 A	12.3 B
Plum Creek Parkway & Wilcox St (#15)	Include Southbound Right Turn Overlap Phasing and EB Left U-Turn Restriction	8	Overall	19.8 B	23.9 C

Table 3 – Improved Intersections LOS Results: 2030

				Year 2040		
Intersection	Intersection Improvement Control		Movement	AM Peak Hour	PM Peak Hour	
				LOS (Delay)	LOS (Delay)	
I-25 SB & Wolfensberger Rd (#1)	- 3 EB Thru Lanes (From 4) - 2 WB Thru Lanes (From 1)	8	Overall	27.8 C	38.6 D	
I-25 NB & Wilcox St (#2)	- Roundabout - New Leg to CDOT Property for Bustang Lot		Overall	48.4 E	21.7 C	
			Northbound Left	Year       AM Peak Hour       LOS (Delay)       27.8 C       48.4 E       8.9 A       11.3 B       11.1 B       8.2 A       8.5 A       8.5 A       8.7 A       31.4 C	10.1 B	
Sixth St & Perry St (#4)	Restrict Eastbound and	STOP STOP	Eastbound Right	11.3 B	15.9 C	
	Right-Turn Only		Westbound Right	11.1 B	16.9 C	
			Southbound Left	8.2 A	9.2 A	
Fifth St & Jerry St (#5)	Single Lane Roundabout	$\Diamond$	Overall	8.5 A	10.1 B	
Fourth St & Wilcox St (#8)	Single Lane Roundabout	$\Diamond$	Overall	8.2 A	17.5 C	
Fourth St & Perry St (#9)	Single Lane Roundabout	$\Diamond$	Overall	7.2 A	12.6 B	
Perry St & Second St (#12)	Single Lane Roundabout		Overall	6.7 A	14.7 A	
South St & Wilcox St (#13)	Single Lane Roundabout	$\Diamond$	Overall	8.7 A	25.8 D	
Plum Creek Parkway & Wilcox St (#15)	Include Southbound Right Turn Overlap Phasing and EB U-Turn Restriction	8	Overall	31.4 C	36.8 D	

Table 4 – Improved Intersections LOS Results: 2040

Intersection Turn Lane	Existing Turn Lane Length (feet)	2030 Calculated Queue (feet)	2030 Recommended Length (feet)	2040 Calculated Queue (feet)	2040 Recommended Length (feet)
I-25 SB On Ramp & Wolfensberger Rd (#1) Westbound Left Southbound Left	200' 125'	36' 172'	200' 175'	50' 228'	200' 225'
Sixth St & Perry St (#4) Northbound Left Southbound Left	60' 70'	25' 25'	60' 70'	25' 25'	60' 70'
Plum Creek Pkwy & Wilcox St (#15) Eastbound Left Eastbound Right Westbound Left Westbound Left Northbound Left Southbound Left Southbound Left	300' 275' 200' 150' 200' 200' 150'	182' 53' 38' 25' 162' 34' 191' 174'	300' 275' 200' 150' 200' 200' 150' TWLTL 175'	287' 202' 44' 35' 254' 54' 345' 211'	300' 275' 200' 150' 200' 200' 150' TWLTL 175'

Table 5 – Turn Lane Queue Length Analysis Results

C = Continuous Turn Lane; TWLTL = Two Way Left Turn Lane; FREE = Channelized Free Right Turn Lane

STIONNA MMUNITY OU



#### How often do you travel Downtown?

Column1	Column2
Never	0
2-3 times a year	2
2-3 times a month	5
Daily	13
2-3 times a week	29

Total





#### What brings you downtown most often?

Column1	Column2
I work there	6
I live there	4
Other	8
I utitlize government services	18
I shop there	28
Entertainment/Eating/Drinking	36

Total





#### When you are downtown, what challenges do you encounter when trying to get around?

Column1	Column2
Limited Handicap Parking	1
Limited Bus Routes	1
Narrow Streets	1
Secure Bike Racks/More paths	2
Construction	4
Safety/Lack of speed enforcement	5
Roundabout difficulty/visibility	9
Traffic Congestion	17
Difficult to park	30

Total







#### Are the sidewalks and crosswalks able to meet your

45

needs?

Column1	Column2
Yes	36
No	9

Total





#### What are the top two transportation challenges you would like addressed downtown?

Column1	Column2
Plan for future growth	1
Train timing	1
Public Transportation/Bus	4
Pedestrian and Bicycle Mobility	8
Sidewalks/Crosswalks (other)	10
Safety	11
Parking	14
Congestion	34

Total





#### Other than more parking, are there specific transportation improvements you would like to see Downtown?

Column1

Column1	Colu	mn2	Other than more	re narl	king an	e there s	necific t	transno	ortation	h	
More stoplights		1	improvem								
Less construction		1	Improvem	entsy	ou wou	id like to	see Do	whitow	11:		
Grade-seperated crossing of train tracks		1									_
One-way Streets		2	Public transportation/Shuttle service								15
More roundabouts		3	Secure bike racks/more paths				8				
Safer Roundabouts		4	Cofee Crossweller								
Safer Crosswalks		4	Safer Crosswarks			4					
Secure bike racks/more paths		8	Safer Roundabouts			4					
Public transportation/Shuttle service		15	More roundabouts		3						
	Total	39	One-way Streets		2						
			Grade-seperated crossing of train tracks	1							
			Less construction	1							
			More stoplights	1							
				0	2	4 6	8	10	12	14	16
			Other than mo improvem	re par ents y	king, ar ou wou	e there s Ild like to	pecific see Do	transpo wntow	ortatioi vn?	٦	
				<sup>3%</sup> 3% 3	%			More sto	oplights		
					5%			Less con	struction		
			38%		8%			Grade-se tracks	eperated ci	rossing of	train
					10%			One-way	/ Streets		

10%

More roundabouts Safer Roundabouts

H MATERIAL I BLIC OUTRE 



### **Community Workshop #1**



#### Most Valued Downtown Element



2

#### **Technical Committee Input**

Agencies and Stakeholder Key Concerns

Themes	Develop Services	Special Events Comm.	Police & Fire	County Facilities	Public Works	Parks & Rec.	Town Manager & Com Relations	EDC DDA DMA Staff	CDOT Transit & PEL	Bike/ Ped Groups	Public Works Comsn.	Planning Comsn.	Douglas County Transit Solutions Comm.	TOTAL
Bike/Ped Safety	X	X	Х	Х	Х	Х	X	Х		Х				
Enhanced Pedestrian Crossings	x	x	x	х	х	х	x	х		X				
Event Traffic Management	X	x	x	х		х	X	x		Х				
Traffic Operations	X	x	x	X	х		X	x	х					
Enhanced Streetscapes	X		x		х	х	X	x		Х				
Connectivity of Trails		x	x	X	х	х				Х				
Connectivity across the railroad	х	x		х	х	х				х				
Downtown- Specific Standards	х		x		х		х	x		х				
Parking Management		x			Х		x	x		х				
Positioning for Transit	х			х	х			х	х				х	
Traffic Calming	Х		Х				Х	Х		Х				
Neighborhood Impacts	Х	x		х	Х		x							
Maintenance Considerations					Х	Х	X		х					
Gateways	Х						X	X						



12

10

### **Community Survey**

What did respondents value most about downtown? Historic architecture and small-town charm

Community gathering spaces – specifically Festival Park Eclectic shops and entertainment Ease of mobility and accessibility What are the biggest transportation concerns Downtown? The design of Wilcox Street at I-25 Interchange High traffic speeds along Wilcox and Perry Streets Availablity of Parking Poor Driver line of sight at many Downtown Intersections



#### How people utilize Downtown

I shop there

28%

l utitlize

government

services

18%

Other

8%

Entertainment/

Dining

36%

#### **Desired Transportation Improvements**





# Castle Rock Downtown Mobility Study (DMS) Public Outreach Summaries

I live there

4%

work there

6%





# Castle Rock Downtown Mobility Study (DMS) Existing PM Peak Traffic Operations





# Castle Rock Downtown Mobility Study (DMS) 2040 PM Peak Traffic Operations With Existing Geometrics



**Develop Curbside Management Plan to** accomodate Transportation Network **Companies (TNCs) in future shared** 

LEGEND

**Third Street** 

Second Street





# Castle Rock Downtown Mobility Study (DMS) 2040 Recomended Traffic Improvements





# Castle Rock Downtown Mobility Study (DMS) 2040 PM Peak Traffic Operations With Recommended Improvements





Intersection Design Example for Angled Parking Cross Section



#### Intersection Design Example for Parallel Parking Cross Section



# Castle Rock Downtown Mobility Study (DMS) Intersection Design Options











# Sidewalk Design Options





# Castle Rock Downtown Mobility Study (DMS) Existing Sidewalk Space Conditions



![](_page_95_Picture_1.jpeg)

# Castle Rock Downtown Mobility Study (DMS) Recommended Sidewalk & Pedestrian Improvements

![](_page_96_Figure_0.jpeg)

![](_page_96_Picture_1.jpeg)

# Castle Rock Downtown Mobility Study (DMS) Bicycling Comfort Level Assessment

![](_page_97_Figure_0.jpeg)

0to

Provide additional bicycle parking throughout downtown. Develop Curbside Management Plan to accomodate traffic in future shared economy

LEGEND

**Third Street** 

Second Street

![](_page_97_Picture_3.jpeg)

![](_page_97_Figure_4.jpeg)

A

![](_page_97_Picture_5.jpeg)

# Castle Rock Downtown Mobility Study (DMS) Proposed Bicycle Facilities

![](_page_98_Figure_0.jpeg)

# OPTION 2: CENTRAL DOWNTOWN

Potential Roundabout at Wolfensberger & I-25 Third Street

![](_page_98_Picture_3.jpeg)

NOTE: THE 3rd OPTION BEING CONSIDERED NORTH OF DOWNTOWN WAS NOT EVALUATED IN THIS EFFORT

Develop Curbside Management Plan to

![](_page_98_Figure_6.jpeg)

#### accomodate transit in future shared economy

#### LEGEND

Bustang Stop Evaluated & Recommended

![](_page_98_Picture_10.jpeg)

Bustang Stop Evaluated & NOT Recommended

Explore Future Shuttle Service For Events & Downtown Circulator

Study Area

![](_page_98_Picture_14.jpeg)

# Castle Rock Downtown Mobility Study (DMS) Transit Evaluation

acific Railroad

![](_page_99_Figure_0.jpeg)

![](_page_99_Picture_1.jpeg)

# Castle Rock Downtown Mobility Study (DMS) Wayfinding in Downtown

**VEHICULAR LEVEL OF SERVICE (LOS) POLICY** Currently LOS goal is D for all of Castle Rock Allowing LOS E Downtown is more practical **Right-of-Way Constraints** More pedestrian & bicycle volumes & conflicts

Level of Service (LOS)	Delay Time				
A	Less than 10 sec.				
В	10 - 20 sec.				
С	20 - 35 sec.				
D	35 - 55 sec.				
E	55 - 80 sec.				
F	More than 80 sec.				

Source: Highway Capacity Manual

![](_page_100_Picture_3.jpeg)

**DOWNTOWN SIDEWALK DESIGN GUIDELINES** Sidewalk width of 8 Ft does not accomodate pedestrians fully Current sidewalks are overprogrammed

![](_page_100_Picture_5.jpeg)

**Recommendations:** Minimum of 10 Ft next to building Preferred 12 Ft for sidewalk furnishings

**Bicycles should be removed from pedestrian sidewalks** Space should be provided for bicycles via bike lanes or trails Bicycle parking should be provided throughout Downtown

Pedestrian Lighting should be consistent throughout Downtown

![](_page_100_Picture_10.jpeg)

#### **MODE SHIFT**

**Downtown Improvements focused on alternative modes of transportation** Improved walkability, bike riding comfort, positioning for future transit Transportation Demand Management programs can improve functionality of roadways Reducing the number of vehicles downtown encourages more historical character of Downtown

Downtown Castle Rock could have "Level-of-Service" for pedestrian and bicycle facilities LOS could be based on walk time, comfort, aesthetics and others

Downtown Wayfinding should be clear, consicise, and consistent Should have separate signage types for; Vehicles Bicycles **Pedestrians** 

![](_page_100_Picture_15.jpeg)

# Castle Rock Downtown Mobility Study (DMS) **Downtown Policy Changes and General Suggestions**