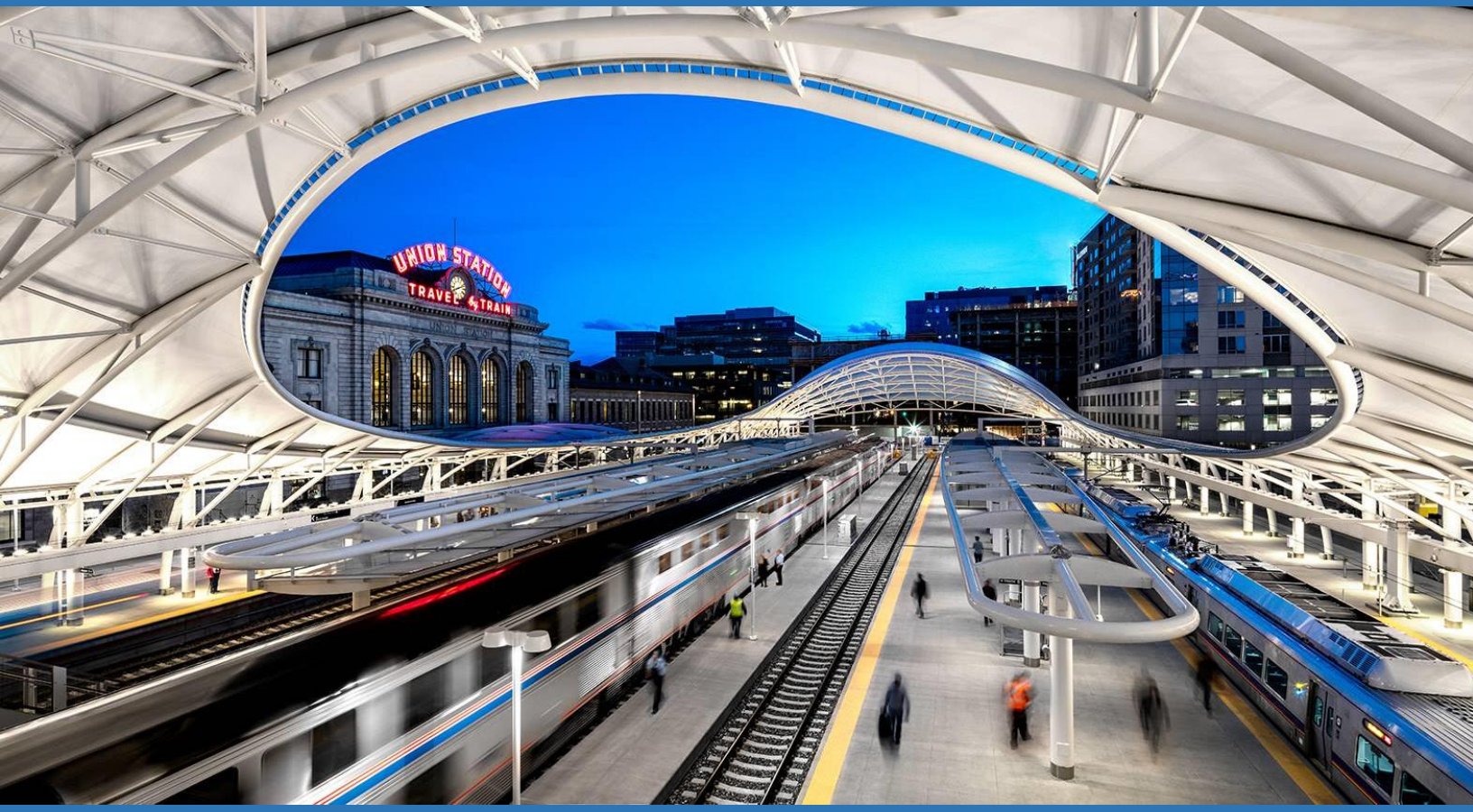
Urban Land Institute (ULI) Colorado

The City of Denver's American Cities Climate Challenge

A Technical Advisory Panel Report



A Report from the City of Denver's American Cities Climate Challenge Technical Advisory Panel (TAP)

By ULI Colorado

October 24-25, 2019

Urban Land Institute
Center for Sustainability and Economic Performance

Bloomberg Philanthropies

American Cities Climate Challenge

NRDC
NATURAL RESOURCES DEFENSE COUNCIL

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Writer:
Marianne Eppig, Director, ULI Colorado

Cover photo by Magda Biernat

ULI volunteers tour downtown Denver with city staff during the Technical Advisory Panel.

Since 1947, the national ULI Advisory Services program has assembled 400+ ULI-member teams to help sponsors find solutions for issues including downtown redevelopment, community revitalization, and affordable housing, among other matters. In Colorado, ULI Advisory Services have provided solutions for such key sites as the Colorado Convention Center, Coors Field, Fitzsimons, and the Denver Justice Center.

Technical Advisory Panels (TAPs)

ULI Colorado's Technical Advisory Panels (TAPs) offer the same expertise at the local level. Each panel is composed of qualified and unbiased professionals who volunteer their time. Panel chairs are respected ULI members with previous panel experience. Since 2003, ULI Colorado has completed more than 60 TAPs, leading to positive policy changes and built projects across the state.

I. Introduction

In 2019, the City of Denver became one of the twenty-five cities participating in the Bloomberg Philanthropies American Cities Climate Challenge. The initiative aims to accelerate and deepen U.S. cities' efforts to create the greatest climate impact through 2020 and showcase the benefits – like good jobs, cleaner air, and cost savings – that climate solutions bring.

As part of the Climate Challenge, the City of Denver is working toward its goal of a fifteen percent reduction below 2005 levels of greenhouse gas emissions by the end of 2020 by lowering energy consumption and reducing emissions from transportation. Of the City's goals to make this happen (shown on page 5), they needed assistance with the final goal of reducing single occupancy vehicle commuting by 50 percent citywide.

In October 2019, ULI Colorado convened a Technical Advisory Panel (TAP) composed of volunteer experts to provide guidance on methods for reducing single occupancy vehicle (SOV) commuting and associated greenhouse gas (GHG) emissions in Denver. Their findings and recommendations are included throughout this report.

ULI volunteers tour downtown Denver with local stakeholders during the TAP.

II. Overview

On October 24-25, 2019, ULI Colorado convened a Technical Advisory Panel (TAP) to provide guidance on methods for reducing single occupancy vehicle (SOV) commuting and associated greenhouse gas (GHG) emissions in Denver. For this two-day TAP, ULI Colorado assembled five land use experts (see panelist bios on page 39) who volunteered to offer objective, third-party advice. The panel reviewed a detailed advance packet of information and plans, toured downtown Denver, and interviewed local stakeholders, including City and state staff, elected officials, property owners, business representatives, and local residents and organizational leaders (for a list of stakeholders interviewed, see page 38).

The City of Denver gave the panelists the following problem statement and questions to address during the TAP:

Problem Statement

A combination of unprecedented growth and development in Denver, changing travel preferences, and new technology-enabled transportation options is changing how Denverites use our streets and curb space. For the city to remain an attractive place to live, work, visit and do business, Denver must utilize its space in a way that maximizes safety and access while helping to meet mobility and sustainability goals.

The City of Denver is interested in understanding how different models of access and pricing at the curb, as well as the availability of off-street parking, can optimize space to serve more people and more purposes. The dominance of 2-hour parking to store private vehicles, often carrying one person, may not always be the best use of public curb space, particularly in busy and dense areas. At the same time, the widespread availability of low-cost off-street parking may encourage driving and may also not be the best use of limited space in a city seeking to improve housing affordability.

The City asked ULI Colorado to provide guidance on how parking policies can maximize access to opportunities, businesses, transit and more, while recognizing changing land use patterns and long-term goals.

The City asked for the panel's insight and recommendations in answer to the following questions:

1. **How can the City incorporate parking maximums into Denver's existing zoning code, especially in urban centers near transit, with buy-in from the development community throughout the city?** Historically, concerns have arisen about parking maximums in high-density, transit areas due to market expectations and lenders who will not finance projects that do not have large amounts of on-site parking. What tools, such as shared parking agreements between private property owners (already allowed per code), would help this type of parking maximum to function now and into the future? How have other projects with little parking been constructed and financed? And how can the relationship between off-street parking access and on-street parking demand work together considering the changing needs for curb space (bus/bike lanes, passenger and goods loading, etc)?

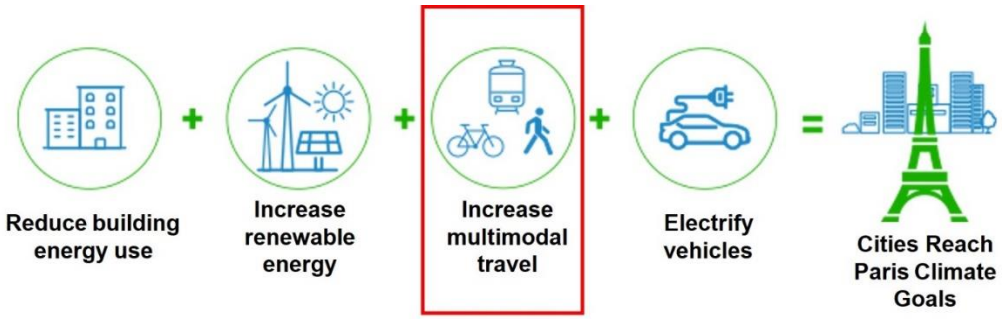
2. **How can Denver identify methods and establish criteria to value (monetize, prioritize, allocate space) the public right of way and curb space, taking into account the stated priorities of the City and County of Denver and the Department of Public Works?** How can the city's approach to curbside management consider existing mobility goals by prioritizing or deprioritizing (through price or space allocation) higher-capacity or more sustainable modes of travel? What are specific models that allow for private companies to utilize the right of way for transportation and for freight or commercial use through pricing and space allocation to meet broader goals?

3. **How can Denver identify and establish a robust loading program that considers the varied public needs of the curbside and the needs of the companies utilizing space?** How can the city create a policy and program to best manage the multiple needs for goods, services, freight, and people loading that considers bike and transit lanes, public parking, and other curbside needs? How do we understand and plan for the needs of businesses and residents receiving goods, the companies performing the service and the city's stated goals? What tools or innovation could be utilized to ensure the city can collect payment for use?

While the City of Denver posed these questions to the panel before the COVID-19 pandemic, the panelists believe that the findings and recommendations included in this report are still relevant and that current realities present new opportunities for transforming parking and curb management policies and practices.

About the Bloomberg Philanthropies American Cities Climate Challenge

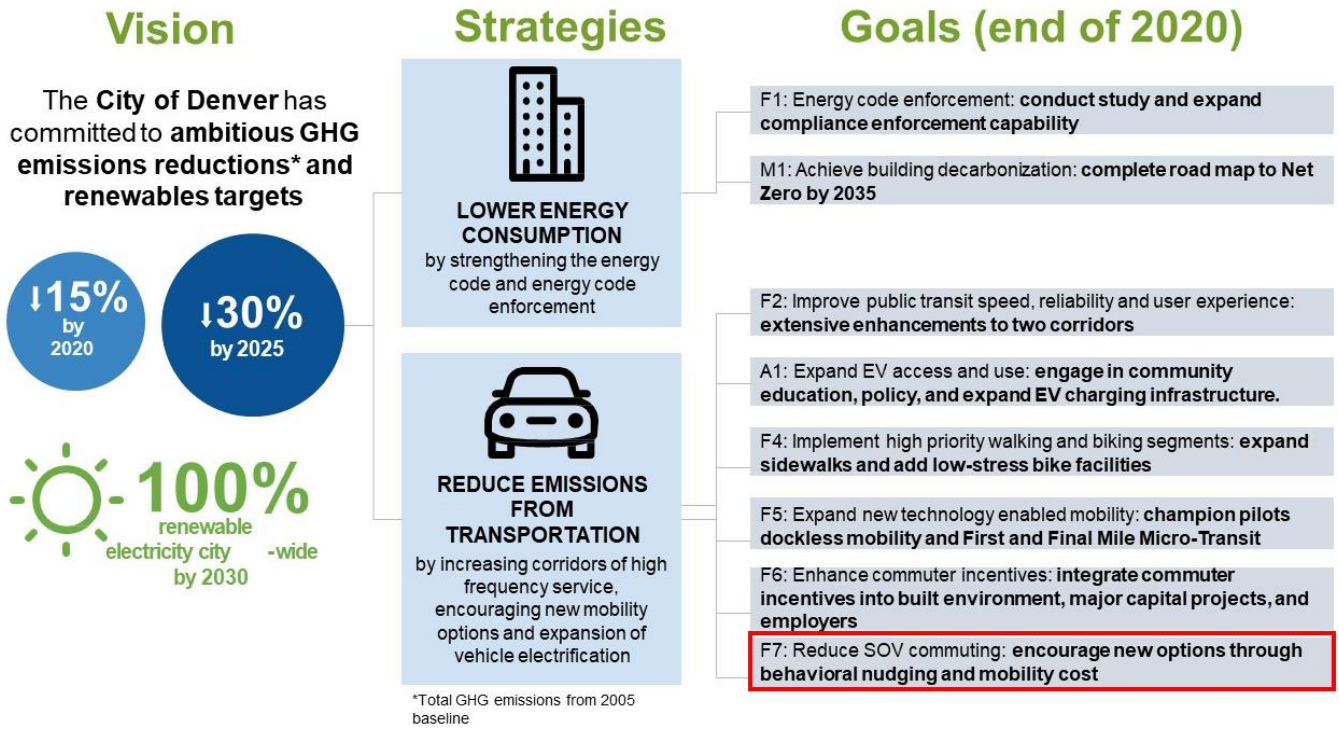
The Bloomberg Philanthropies American Cities Climate Challenge is a $70 million program that empowers twenty five of the largest U.S. cities to implement near-term climate goals and become primary drivers of progress towards meeting America's pledge for the Paris Climate Agreement. Participating cities have committed to specific policy and practice actions which will allow them to achieve ambitious carbon reduction goals.



Of the subject areas covered by the American Cities Climate Challenge to reach the Paris Climate Goals, this TAP focuses on increasing multimodal travel.

The Climate Challenge provides technical expertise to participating cities to facilitate the development and passage of high impact policies, training for senior leadership, technical assistance, and activities to facilitate citizen and stakeholder engagement for community buy-in.

ULI's Center for Sustainability and Economic Performance partnered with the Natural Resources Defense Council (NRDC) to facilitate the engagement of ULI members in activities related to the American Cities Climate Challenge. ULI Colorado received a grant from ULI's Center for Sustainability and Economic Performance to host this Technical Advisory Panel (TAP) and provide guidance to Denver on transportation policies.

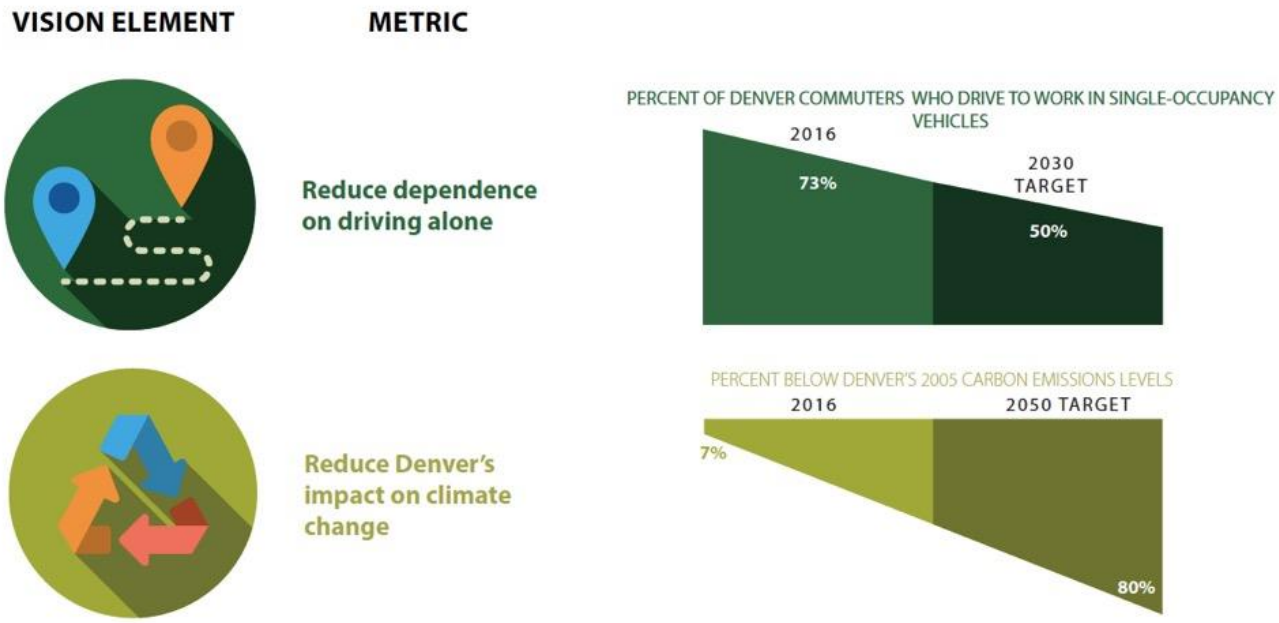


Denver's vision, strategies and goals for the Climate Challenge. This TAP focuses on providing guidance on goal F7: reducing single occupancy vehicle commuting.

In Denver, transportation is the second largest source of carbon emissions, behind only electricity. The City of Denver's goal that they asked the TAP to address is the reduction of citywide single occupancy vehicle (SOV) commuting rates by fifty percent by 2020, which will ultimately help to reduce regional carbon emissions. To make progress toward this goal, the City requested ULI analysis and recommendations on parking and curbside management policies that incentivize alternatives to SOV commuting.

Denver Context & Plans Related to Parking & Curb Management

The City of Denver's Comprehensive Plan 2040 lays out the following targets for carbon emissions and single-occupancy vehicle commuting:



Infographics from page 21 of Denver's Comprehensive Plan 2040.

Goal 9 from Denver's Comprehensive Plan 2040

GOAL 9: Advance innovative curb lane management and parking policies.

STRATEGIES

A. Promote strategies to balance demand for the curb lane (where vehicles park and load) that responds to the land uses on that street.

B. Promote on-street parking management strategies that maximize use of the curb lane and are tailored to the context and needs of specific areas at different times of the day.

C. Balance the demand for on- and off-street parking with other community goals including affordability and sustainability.

D. Implement innovations in pricing and regulations to better optimize the supply of curb lane access.

Source: Page 42 of Denver's Comprehensive Plan 2040.

Blueprint Denver is the city's framework for land use and transportation decision-making through 2040. For transportation, the plan promotes a vision of complete networks facilitating the movement of pedestrians, people on bicycles, on transit, and in cars or moving goods.

Blueprint Denver includes the following Mobility Recommendations:

02

Align the impacts of private development with transportation infrastructure and promote development that creates walkable, transit-friendly communities.

GOALS: 1, 3, 4

Certain types of development, such as those that provide a high number of on-site parking spaces, can increase demands on the transportation network by generating more trips in single-occupancy vehicles. Developments can mitigate impacts to the overall transportation system by encouraging trips through more efficient modes.

A. Adopt policies that require Transportation Demand Management programs for developments to maximize use of alternative modes and reduce single-occupancy vehicle trips on Denver's streets.

B. Work with city agencies to explore the feasibility and effectiveness of increased participation from new development to improve transportation infrastructure.

C. For centers and corridors downtown and in the urban center contexts, where access to transit is high, study and implement maximums for off-street parking in private development to encourage the use of alternative modes of transportation.

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Maximize the use of curb space — often used for on-street parking, loading and drop-offs — according to land use context.

GOALS: 1, 3, 4

As more trips occur on Denver streets — including delivery services, transportation network companies (TNCs), transit and bicycles — there are competing needs for the curb-space or curb-lane. This space should be strategically used to benefit the most number of people.

A. Develop policies that consider the highest and best use of the curb space based on context and what benefits the most number of people.

B. Study impacts to right-of-way and curb-space from emerging services such as shared mobility and on-demand services. This includes transportation network companies and storage of personal mobility vehicles such as dockless bike share, scooter share and personal bike corrals. Implement policies to provide the greatest and best use of the curb-space.

The Mobility Recommendations above are on pages 108 and 113 of *Blueprint Denver*, respectively.

Denver's Goals for Off-Street Parking

The City of Denver's plans have articulated an interest in reducing the availability of off-street parking in order to meet mobility and housing affordability goals. For instance, the Mayor's Mobility Action Plan from 2017 calls for parking management in development, combined with Transportation Demand Management (TDM) strategies to reduce parking demand.

Currently, Denver is on the path of removing existing minimum parking requirements in downtown zone districts, which the panelists support.

Zones that do not have minimum parking requirements for development include the Downtown Core, the Theater District, the Civic District, sections of Arapahoe Square, and Central Platte Valley-Auraria (which also has parking maximums). At the time of writing, downtown zone districts that have minimum vehicle parking requirements include Lower Downtown, Golden Triangle, and properties at the

"For our micro housing project in LoHi, we would have parked it lower, but we had to beg for reductions in parking. We will pay a ton for 15 stalls that no one will use. The city required these."

- Matt Mahoney, Revesco Properties

northern edge of Arapahoe Square. A proposed zoning update would remove all minimum vehicle parking requirements in Golden Triangle if it is passed. City staff mention that minimum vehicle parking requirements would likely be proposed for removal in a future zoning update for Lower Downtown, but that is not currently scheduled. Their assumption is that after a proposed Golden Triangle text amendment is adopted, about 90 percent of downtown Denver will not have parking minimums (excluding Lower Downtown, the northern section of Arapahoe Square, PUDs, and other custom zoning arrangements).

However, in 2017 Denver City Council voted to scale back a previous zoning provision that exempted pre-existing small zone lots (equal or less than 6,250 square feet) from all minimum vehicle parking requirements. While this seemed like a step backward to many, City staff maintain that there are relatively few small lots in the downtown and some development on such small lots can still obtain the exemption from a minimum parking requirement (see Denver Zoning Code Section 10.4.5.1.A for more information).

Outside of downtown, Denver still requires parking minimums for most development, perpetuating the over-building of parking throughout the city and supporting the use of cars.

The City is now experimenting, however, with the use of parking maximums. Denver's first parking maximums have been adopted for River Mile in Central Platte Valley-Auraria. The proposal to add parking maximums to Fox Station East near 41st and Fox did not gain traction. The parking maximums proposed for both River Mile and Fox Station East were similar to or slightly higher than existing parking maximums in Seattle and Portland.

"In the River Mile, we have zoning with parking maximums. There's only so much parking the city is able or willing to give, but there are many transit and mobility options in the area. Mobility studies are important for selling projects."

- Matt Mahoney, Revesco Properties

Parking Minimums in Downtown Denver

Most Downtown zone district currently have no minimum vehicle parking requirements. These include:

- D-C (the Downtown Core)
- D-TD (Theater District)
- D-CV (Civic District)
- D-AS-12+ and D-AS-20+ (Arapahoe Square)
- D-CPV-T, D-CPV-R and D-CPV-C (Central Platte Valley-Auraria)*

*D-CPV-T, D-CPV-R and D-CPV-C districts include maximum vehicle parking requirements. See Denver Zoning Code Section 8.11.5.

Two Downtown zone districts currently do have minimum vehicle parking requirements:

- D-AS (Arapahoe Square): Note that this district is distinct from D-AS-12+ and D-AS-20+. This district applies to only 3-4 properties at the northern edge of Downtown.
- D-GT (Golden Triangle): A zoning update currently underway proposes to remove all minimum vehicle parking requirements in D-GT.
- D-LD (Lower Downtown): Minimum vehicle parking requirements would likely be proposed for removal in a potential future (not currently scheduled) zoning update.

Note that Downtown may include some PUDs or other custom zoning arrangements that do have minimum vehicle parking requirements.

Denver Community Planning and Development staff stated that after a proposed D-GT text amendment is adopted, about 90% of downtown Denver won't have parking minimums.

Denver's Desire to Make the Best Use of Curb Space and Right of Way

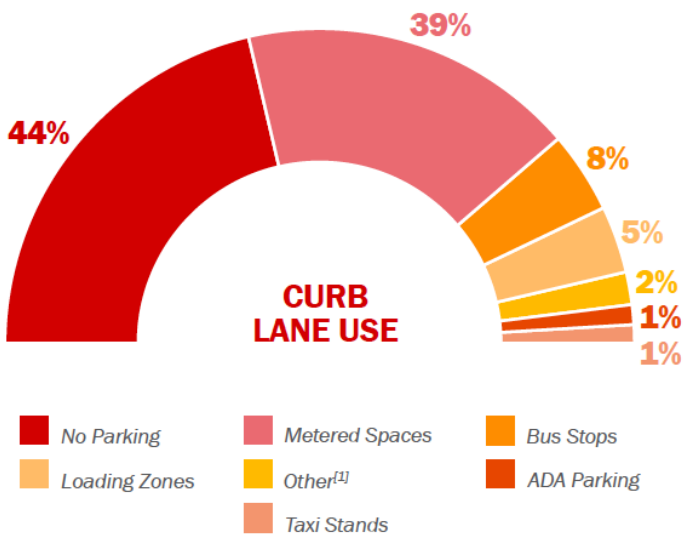
The City of Denver wants to transform its transportation system by providing more transportation choices to move people more efficiently, safely and sustainably. Most residents currently drive alone and the streets have been built largely to accommodate cars. However, the City is committed to creating a network of infrastructure so people can comfortably ride a bike, walk, or take transit.

As articulated in *Blueprint Denver*, the City seeks to maximize the use of curb space according to surrounding land uses. Currently, curb space is often used by on-street parking, loading and drop-offs. New uses such as on-demand delivery, ride-hailing, transit, shared mobility and bike lanes are competing for access to the curb or curb-lane.

The City desires to strategically use that space to benefit the greatest number of people for each land use context, while also providing consistency across blocks so that people know where to find different types of curbside access.

"Downtown curb space is misallocated and underused. With better management and increased flexibility, curb space use can be optimized for the public good."

- Page 29 of the 2019 "Denver Moves: Downtown State of the System" report



Downtown Denver curb lane use. Source: page 29 of the 2019 "Denver Moves: Downtown State of the System" report.

Competing Interests for the Curb

Competition for the curb can be seen across Denver with the increasing use of mobility options like rideshare and scooters, on-street parking, bike parking and lanes, pedestrian access, valet, loading and transit.

Denver has existing policies and procedures to handle a number of curb uses, including:

Short-term parking

The City can post signs to limit the duration of parking. Historically, 30 minutes has been the shortest time limit for short-term parking spaces. These spaces are not loading zones and vehicles must be

Parking Pushback

The City has repeatedly experienced pushback when parking is removed. For instance, when Union Station was redeveloped, surface parking lots were transformed into a plaza with infill development. Some groups in LoDo reportedly continue to push back since those parking spaces were not replaced despite the significantly enhanced community amenities.

moved after designated time limits. Loading zones are restricted to vehicles performing business functions like loading and deliveries.

Businesses can submit a request for short-term parking restrictions in a commercial area. This is not designed to supplement business' existing off-street supply and short-term parking should benefit land uses along the block for which it is proposed. The City considers proximity to other spaces, frequency of use and customer needs when reviewing proposals.

The City uses parking pricing with meters to maximize the availability of parking spaces. The goal in pricing parking is to manage outcomes, not increase revenue. The City's target occupancy for on-street parking in a commercial corridor is 75 to 85 percent. To accomplish this, other cities have adjusted the price of parking to reflect demand in order to make it easier to find spaces, thereby reducing circling and congestion.

Carshare parking

Denver also allows carshare vehicles to access curb space for parking. Carshare vehicles are exempt from parking time limit restrictions and from meter payment, in exchange for an annual fee from the fleet owner. Carshare fleet owners may also request dedicated on-street spaces for a fee.

EV charging

Businesses that wish to dedicate electric vehicle (EV) parking to promote the use of EVs may apply to use the right of way. The designated parking spaces must include a charging station with a 4-hour standard time limit. Power for the station must come from the business and the station must be open to the public, with no fee paid to the business.

Examples of Curb Space Competition in Denver

Union Station likely has the most variety of uses in a very compact space, especially on Wewatta and Wynkoop Streets. At Union Station, you'll see private companies with mobility options, bike parking, pedestrian access, valet, loading and transit, including bus layovers and buses waiting to enter the bus barn.

Neighborhoods throughout the city exhibit tensions as well, like South Pearl Street. In LoHi, there is increasing density of residents and competition among neighbors for parking spaces on the street. In residential areas throughout the city, there is loading of goods in alleys that can block residential access to garages.

Additionally, bike lanes are often blocked with vehicles loading, dropping off passengers and making deliveries.

Valet policies

The City of Denver also has an ordinance regarding valet parking services. Valet services may apply for access to the curb and existing metered parking spaces.

Loading Zones

Loading zones are for unloading or loading goods and passengers and are offered as a shared resource in the public right of way to serve multiple entities on any given block. The City designates general loading zones to serve any vehicle up to 30 minutes, passenger loading zones up to 10 minutes, truck or commercial loading zones with licensed vehicles, and truck or commercial loading with annual permits. The city has the right to assess fees for loading zones and zones can be flexible for combined uses.

Approximately 50 percent of Denver's loading zones are general loading. 60 percent of those do not have time limits. Most of the spaces with time limits are for 15 or 20 minutes. About 33 percent of loading zones are designated for passengers, primarily without time limits, and 16 percent are for trucks specifically, none of which have time limits.

Passenger Pick Up and Drop Off (Ride Hailing)

Denver does not currently regulate transportation network companies (TNCs, like Uber and Lyft), since the authority lies with the state, but is looking into methods for doing so. In the meantime, Denver is interested in learning how to mitigate the impact of ride hailing on curbs and streets.

The City is piloting a loading zone for ride hailing at the Denver Performing Arts Center and will be evaluating its impact. Evaluation metrics include:

- Parking garage occupancy
- Travel modes of arrival
- Collisions and injuries by mode
- Average number of daily pick ups and drop offs
- Volume of vehicles, bikes, pedestrians, scooters, transit passengers, etc.
- Travel times, average speed, delay
- TNC data sharing metrics, including curbside dwell time
- Effectiveness of loading zone (how many TNCs are and are not using pilot zones)
- Pedestrians picked up or dropped off in travel lanes

Food trucks

Licensed food trucks with permits can park along the street outside of the Central Business District if they follow parking regulations and are more than 20 feet from an intersection and 300 feet from a park (except for during events).

Bike corrals

The City will fund and install bicycle parking in the right of way at locations requested by property owners and businesses. Businesses can also apply to install their own bike parking on public property. Both of these options include a standard U-type rack on the sidewalk, or an on-street corral along the curb. The Department of Public Works has also identified key locations to remove a car parking space and add an on-street bike corral to provide more bike parking, while improving visibility at intersections.

E-scooter parking

An updated ordinance adopted in August 2019 allows for scooters to park on the curb to facilitate pedestrian access on the sidewalk. The ordinance states that scooters may be parked in the roadway along the curb where car parking is not allowed and where it will not impede traffic. E-scooters may also be parked on the sidewalk, as long as it does not impede pedestrian movement.

Transit

The City of Denver facilitates transit access at the curb so that bus stops and other bus operations are prioritized over other uses, including parking.

Conclusion

The City of Denver seeks to accommodate growth and improve quality of life by utilizing public and privately-owned spaces to maximize community benefits. By rethinking how curb space and off-street parking space function, the City hopes to help meet its mobility and livability goals now and into the future. The City requested advice from the TAP panelists on how to best manage these assets in a way that offers the most benefits to the greatest number of Denverites.

Auto and Goods Movement

Vehicle technologies for personal vehicles and the ways goods are distributed and received are rapidly changing.

Driverless Technology

Technology for vehicles is rapidly evolving. Denver is positioned to adapt to these changes as it implements new roadway technologies to improve safety for all modes. This includes signals that can detect pedestrians as well as communicate with vehicles. *Blueprint Denver* recommends to explore these technologies further while also addressing the impacts that autonomous vehicles are likely to have on transportation infrastructure. As infrastructure adapts, Denver must ensure that people walking and rolling remain a priority as everyone is a pedestrian at some point during their trip. While it is not certain when driverless vehicles will become commonplace on the roadway, Denver must still be prepared for their arrival.

Blueprint Denver acknowledges that while driverless vehicles may slightly improve roadway capacity, single occupancy and driverless vehicles are still least efficient in terms of the ability to move people in comparison to other modes. This is because, driverless or not, vehicles still take up the same amount of space on the roadway. *Blueprint Denver* also recognizes that as autonomous vehicles become more commonplace, Denver will need to study impacts to parking and curb space.

Safety & Vision Zero

Denver has a goal to eliminate traffic deaths through the *Vision Zero Action Plan*. Achieving the *Vision Zero* goal will only happen through making our roadways safer. This includes traffic calming techniques such as diversion, road-diets, speed reductions and restrictions to turning movements to help avoid collisions.

Goods Movement & Freight

Online shopping and services and evolving technologies have changed how people receive goods and how they are distributed. This has impacts to Denver's transportation infrastructure. The movement of freight is also moving beyond traditional commercial vehicles and delivery trucks. Denver's transportation network must address these changes by establishing clear networks for the movement of freight and updating policies accordingly.

Curb Lane Uses

Space along the curb is in high-demand in Denver, not just for parking, but for uses including vehicle loading, car share parking and bike parking. As emerging mobility technologies such as transportation network companies and carshare become more common, the uses for space next to the curb are becoming more diverse. As these demands increase, *Blueprint Denver* acknowledges that this should be based on the highest and best use that services the most number of people. This is consistent with Denver's goals of moving people, not just vehicles, on Denver's streets.

Auto and Goods Movement as articulated in *Blueprint Denver* 2019, page 180.

Bicyclists take advantage of protected bike lanes in downtown Denver.

III. Findings

During the workshop, the panelists toured downtown Denver, spoke with local stakeholders, and reviewed materials from the City of Denver about parking and curb management in Denver. Before diving into recommendations, the panelists came up with the following findings.

Assets & Opportunities

Panelists agreed that the City of Denver is well positioned to move toward its goals for better managing the curb, right of way and off-street parking to maximize community benefits. Some of the specific assets and opportunities include:

- The City's progress toward its priorities, including development of a Transportation Demand Management (TDM) plan for new development, a shared mobility program, the parking pricing study, *Denver Moves* plans and goals, the transit system, bike lanes, bike corrals, bus lanes, Transit Oriented Development (TOD), and the Climate Action Stakeholder Process.
- Denver is a great environment for addressing climate change initiatives since it has an active, receptive population.
- Denver has many sub-markets. Different areas require different approaches.
- There is a call for more data on on-street and off-street parking utilization.

Challenges

Parking availability and pricing can be a hotspot for public debate. To accomplish its goals of reducing single occupancy vehicle (SOV) commuting and associated emissions, the City will need to address this and other challenges head on. Some of the other identified challenges include:

- Free or low on-street parking pricing and fines, supporting SOV commuting
- Inconsistent pricing along curb (valet services pay for access while TNCs do not)
- Parking time limits are difficult to enforce
- Parking revenues are invested in the general fund, not specifically in mobility needs
- Outdated rules and regulations for parking and curb management
- Curb design challenges lead to conflict between uses
- Need to manage pick ups and drop offs along curb
- Right-sizing off-street parking is difficult

Double-parked cars in downtown Denver are problematic because they block traffic and are difficult to enforce.

ULI volunteers discuss options for parking and curb management with stakeholders during the Technical Advisory Panel.

IV. Recommendations

The panel's recommendations are divided into sections based on the questions posed to them:

1. **Right-Sizing the Off-Street Parking Supply** recommendations begin on page 19.
2. **Valuing the Public Right of Way** recommendations begin on page 22.
3. **Curb Management** recommendations begin on page 26.
4. **Key Takeaways** begin on page 30.

How Parking and Curb Management are Related to Climate Change

In the United States, the transportation sector accounts for 29 percent of all greenhouse gas (GHG) emissions, making it the largest contributor of emissions in the country. In Colorado, transportation contributes around 31 percent of GHG emissions according to the Colorado Department of Public Health & Environment.

The amount of parking available, its price, and its convenience all affect how people decide to travel. Since it is cheap and relatively easy to drive to and within Denver, the amount of single occupancy vehicle (SOV) commuters is high, contributing to traffic and greenhouse gas emissions.

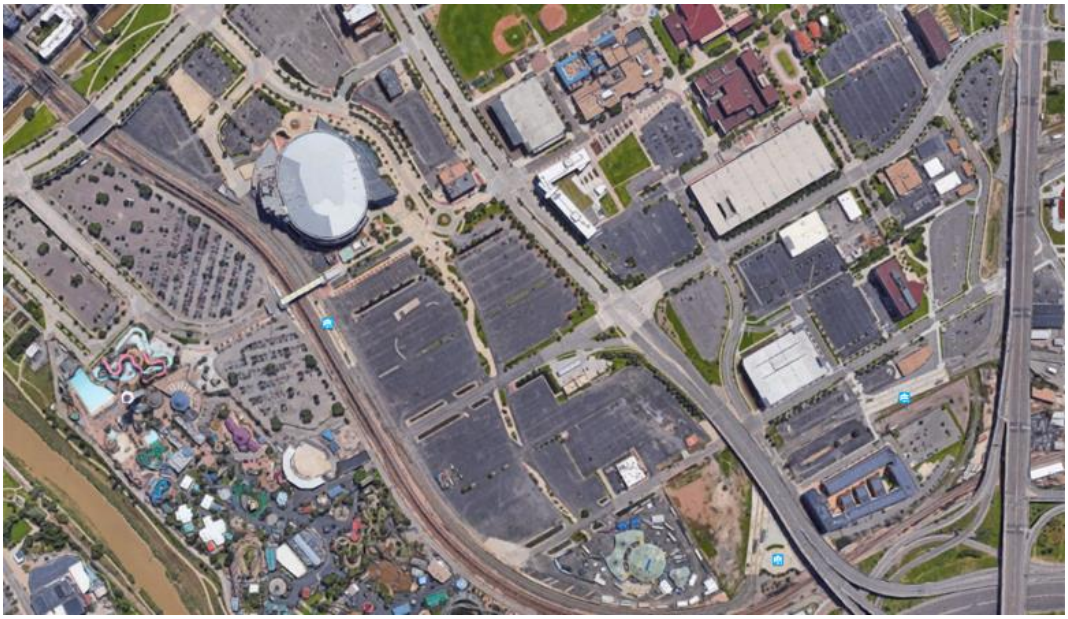
Ultimately, parking decisions help shape:

- How many people decide to drive and park each day

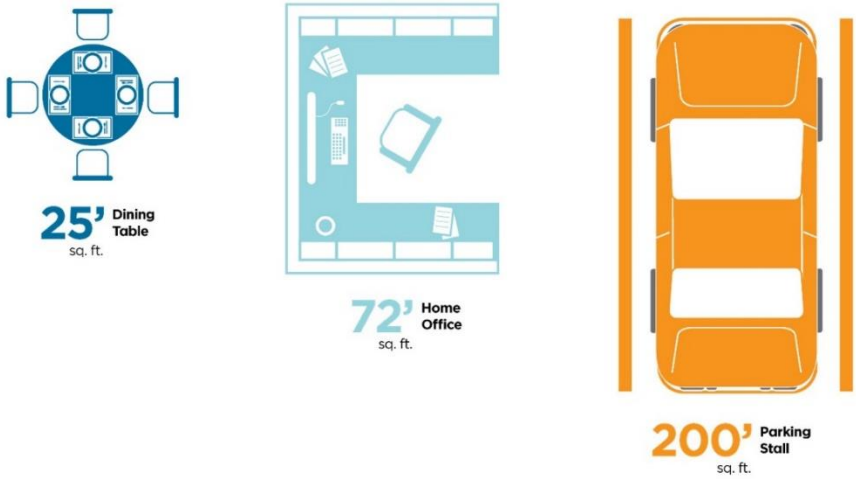
- How easy it is to get to work on time
- Whether distances are walkable between destinations
- How much money is spent on parking spaces versus alternative commute options
- How much traffic and pollution we generate

Why this is important:

- Parking takes up a lot of space, affecting more of our built environment than almost any other land use
- No one wants congested streets
- Decisions regarding parking are a statement about our modal priorities and values as a community
- How much parking is developed and its price is a key decision point for cities

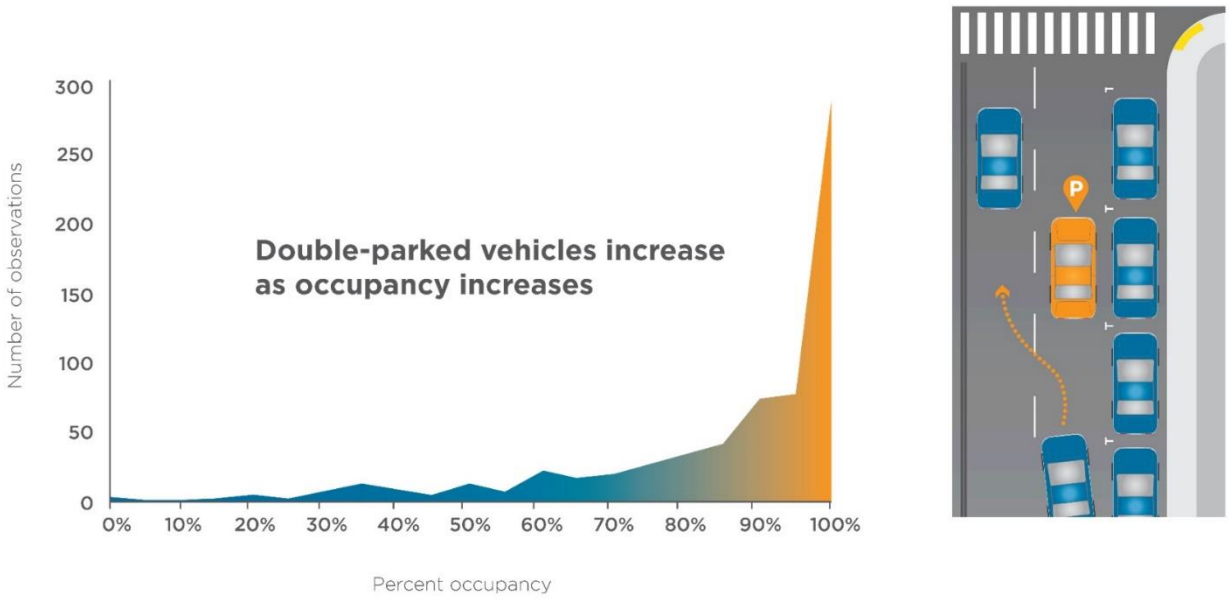


Aerial view of how much land parking consumes near Denver's Pepsi Center, Mile High Stadium, and West Auraria. This area includes three light rail stations and will be redeveloped as part of River Mile, which will include parking maximums. Photo courtesy Streetsblog.



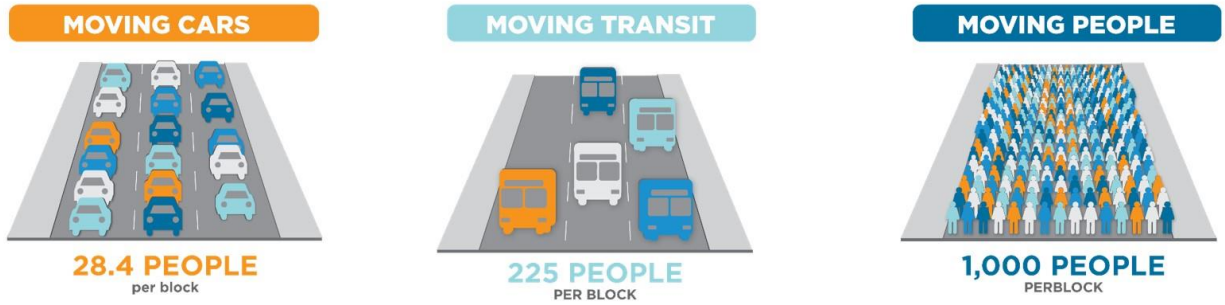
Comparison of how much space parking requires. Image courtesy Nelson\Nygaard.

Parking Influences Traffic:



Influence of double parking on traffic. Double parking increases when parking is inexpensive or parking times are not limited. Image courtesy Nelson\Nygaard.

Parking Influences Access:



Density of people with different transportation options. Image courtesy Nelson\Nygaard.

Parking Influences Vehicle Miles Traveled (VMT):

TRANSPORTATION DEMAND MANAGEMENT MEASURE	PERCENT POTENTIAL REDUCTION
Limit parking supply	5-12.5%
Unbundle parking costs from property cost	2.6-13%
Market price public parking	2.8-5.5%

How Transportation Demand Management (TDM) measures related to parking result in greenhouse gas emission reductions from fewer vehicle miles traveled (VMT). Data courtesy California Air Pollution Control Officers Association (CAPCOA). Graph courtesy Nelson\Nygaard.

The chart below is from "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures" by the California Air Pollution Control Officers Association (CAPCOA). The chart shows ranges of effectiveness for quantified greenhouse gas mitigation strategies.

According to CAPCOA, parking and land use decisions have the greatest potential for GHG emission reductions. Their analysis showed specifically:

- Limiting parking supply is one of the most impactful tools, with around 5 to 12.5 percent reduction in GHG emissions.
- Land use density, diversity, and location efficiency are also extremely important, and could result in the most VMT and GHG emission reductions.

Category	Measure Number	Strategy	BMP	Grouped With #	Range of Effectiveness	
					Percent Reduction in GHG Emissions	Basis
Land Use / Location	LUT-1	Increase Density			1.5-30.0%	VMT
	LUT-2	Increase Location Efficiency			10-65%	VMT
	LUT-3	Increase Diversity of Urban and Suburban Developments (Mixed Use)			9-30%	VMT
	LUT-4	Incr. Destination Accessibility			6.7-20%	VMT
	LUT-5	Increase Transit Accessibility			0.5-24.6%	VMT
	LUT-6	Integrate Affordable and Below Market Rate Housing			0.04-1.20%	VMT
	LUT-7	Orient Project Toward Non-Auto Corridor			NA	
	LUT-8	Locate Project near Bike Path/Bike Lane			NA	
	LUT-9	Improve Design of Development			3.0-21.3%	VMT
Parking Policy / Pricing	PDT-1	Limit Parking Supply			5-12.5%	
	PDT-2	Unbundle Parking Costs from Property Cost			2.6-13%	
	PDT-3	Implement Market Price Public Parking (On-Street)			2.8-5.5%	
	PDT-4	Require Residential Area Parking Permits		PDT-1, 2 & 3	NA	

Chart on page 65 of the CAPCOA report, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures."

RIGHT-SIZING THE OFF-STREET PARKING SUPPLY

Questions for the Panel: How can the City incorporate parking maximums into Denver's existing zoning code, especially in urban centers near transit, with buy-in from the development community throughout the city? Historically, concerns have arisen about parking maximums in high-density, transit areas due to market expectations and lenders who will not finance projects that do not have large amounts of on-site parking. What tools, such as shared parking agreements between private property owners (already allowed per code), would help this type of parking maximum to function now and into the future? How have other projects with little parking been constructed and financed? And how can the relationship between off-street parking access and on-street parking demand work together considering the changing needs for curb space (bus/bike lanes, passenger and goods loading, etc)?

While the City asked the panelists specifically about how to implement parking maximums, the panelists took a step back to address the most efficient and effective methods for right-sizing the quantity of off-street parking, which is what parking maximums seek to address.

Parking Maximum Challenges

Parking maximums place a cap on the amount of parking that can be built within specified zone districts. They are a powerful regulatory tool for reducing the systemic overbuilding of parking supply that continues to encourage and subsidize travel by single occupancy vehicles. However, parking policies should be approached with careful consideration of potential side effects. Parking maximums can be perceived as blunt regulatory instruments since they typically do not adapt to changing market dynamics and uses over time.

Panelists noted the following challenges with implementing parking maximums:

- Difficult to evaluate the appropriate amount of parking needed in developing areas
- Transit options are not fully developed
- Many Coloradans keep their cars to go into the mountains, where there are few transit options
- Plans and land uses change over time
- Building uses change
- Diversity of neighborhood contexts
- Neighborhoods are constantly evolving
- Significant planning department time would be required to evaluate variances

In response to proposals regarding parking maximums, a number of concerns from developer and financing communities have arisen, including:

- Slowing development: With proposed parking maximums in yet-to-be-developed areas, there was concern that the City does not know what the parking ratio should be and that if the City sets it too low, it could effectively prohibit or slow development in the area.
- Disinterest from tenants: Stakeholders said that, unlike other cities that have parking reservoirs available near transit, proposed locations like 41st

"There are several Denvers – they're all different and require different amounts of parking. You can do things near transit stations that you can't do in other areas."

- George Thorn, Mile High Development

"Be careful about instituting parking maximums citywide: it will just open the city up to a lot of variances. We need more transit service to be able to market developments that have less parking. You can't reasonably replace a car with the current services, especially if you want to go into the mountains."

- Kirsty Greer, McWhinney

"We don't want to build parking – it's a terrible waste of money and we can't charge enough money to cover it."

- Kirsty Greer, McWhinney

and Fox in Denver do not. There was concern that residents or tenants would not have any place to park and therefore wouldn't lease in the newly built locations.

- **Difficult to secure financing:** In order to finance projects, the project must be seen as clearly viable, and it often won't be considered viable without at least 1 parking spot per unit, according to the City's interviews with stakeholders in Colorado.
- **Chicken before the egg:** There has been concern that parking maximums cannot come until there is a much more robust investment in transit and other multimodal options. Developers and financiers claimed that until the options and infrastructure are in place and people are using them, it would be challenging to build with meaningful parking maximums.

"Reducing VMTs assumes there's transit – but we have a hard time establishing a baseline for transit access. Parking maximums are a hard hammer – there are other tools, like zero parking minimums and shared parking."

- Chris Gleissner, Development Projects Manager, Community Planning & Development

Tools for Right-Sizing Parking

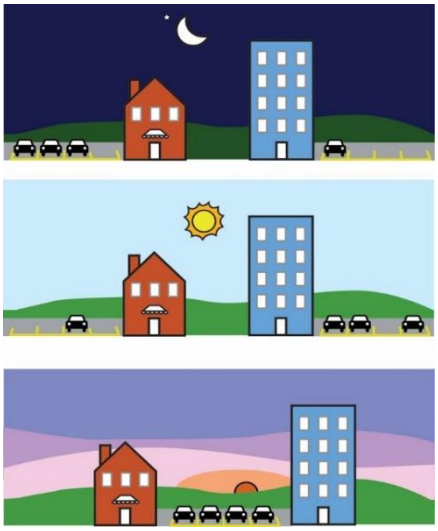
Overall, parking maximums may be appropriate in transit-rich areas. The panelists recommended tracking outcomes of the parking maximum in River Mile as the area is redeveloped over time. They also suggested that piloting flexible parking maximums in other transit-rich areas might send the right market signals to lenders and underwriters without as many potential risks for developments.

In addition to parking maximums, the panelists recommended the following more incremental approaches to right-sizing the parking supply in Denver.

- **Remove Parking Minimums:** Getting rid of minimum parking requirements means that developers do not need to build a minimum amount of parking predetermined by the City for each project. Instead, developers could determine the amount of parking needed for each use based on market demand to make the project successful. Developers generally try to avoid overbuilding parking since revenue rarely covers the full cost of building parking spaces. In areas where removal of parking minimums is difficult, the City could lower existing parking minimums or increase flexibility for meeting parking minimums. Many cities, including San Francisco, Minneapolis, Buffalo, and Hartford, have removed parking minimums and many others have removed them in their downtowns.
- **Allow Shared Parking & Parking Districts:** The City could allow for more flexible shared parking arrangements between uses, especially since the uses may require parking at different times of day. As part of this, panelists noted that parking structures should be an allowed building type within those zone districts and that public parking must be paid and managed. Some currently private parking may become more commercially viable with shared parking arrangements, which might encourage more developers to "unbundle" parking costs from housing costs (as opposed to automatically including parking costs in rents), making housing more affordable citywide for those who don't have cars.

"We're becoming more comfortable with lower parking ratios and shared parking. Parking ratios depending on location, whether people have a real need for a car, and if there are similar projects that have been successful."

- Ryan Sahd, First Bank



The image above illustrates how residential uses (on the left) require parking at night and office uses (on the right) require parking during the day. Shared parking would work well for these uses. Image courtesy Nelson\Nygaard.

- **Adopt and Implement Denver's Transportation Demand Management (TDM) Plan**: City staff have been working on Denver's TDM Plan, which deals with strategies that shift the how, when, and/or where of people's travel behavior to increase system efficiency, reduce single occupancy vehicle (SOV) trips, and achieve specific planning goals. The plan includes regulations that require developers to implement and monitor their own TDM programs and report results to the City.

> "We don't know if the parking ratios are right in RiNo. More shared parking structures would be great as a district-wide solution."
>
> - Abe Barge, Community Planning & Development

- **Increase Investments in Transit and Multi-Modal Transportation Systems & Allow Temporary Parking in the Meantime**: We can't expect people to stop using their cars if there aren't sufficient alternatives in place for them to meet their transportation needs. While these transit and multi-modal system investments are being made, allow temporary parking for developments that will be in transit-rich areas once transit options are fully developed.
- **Require Higher Development Density & Mixed-Use in Transit-Rich Areas**: In Denver's transit-rich areas, require and/or allow for greater density by relaxing height restrictions, increasing Floor Area Ratio (FAR) minimums, streamlining the entitlements process, and promoting effective mixed-use. Higher density is critical to supporting transit use and thus increased service.
- **Provide Resources to "Prove the Case" for Lower Parking**: Insurance underwriters, investors, and tenants frequently pressure developers to include more parking. To reduce perceived risks around less parking and subsequent project marketability, the City could provide resources that help to prove the case for lower parking, such as transit-sheds, reported TDM data, shared parking availability, and any regulations related to lower parking.

Examples of Tools for Right-Sizing Parking

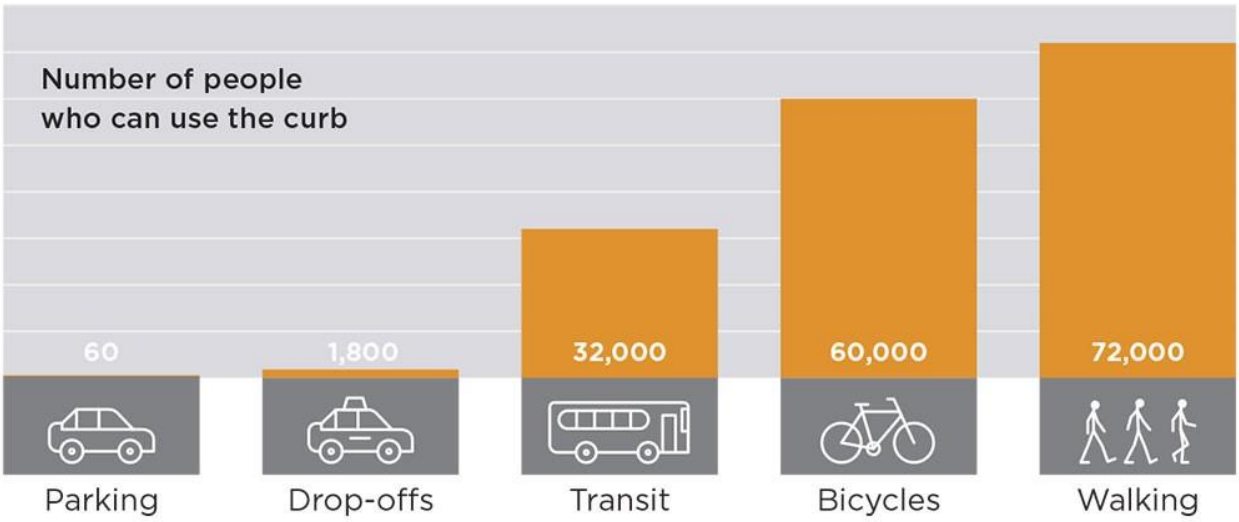
Currently, there is a large gap in data for both on-street and off-street parking availability and usage in Denver. Since developers may have parking utilization data for their specific projects, the City could aggregate this information with the goal of right-sizing the parking supply across the city (for more recommendations related to data collection and analysis, see pages 31-32). San Francisco and Seattle have parking databases that show parking utilization and pricing, which can be used to guide parking supply and management decisions:

The GreenTRIP Parking Database provides data from 80 multi-family residential sites around the San Francisco Bay Area. The data shows parking supplied and parking used at each site. Use the parking database to search for sites similar to a project you have in mind and to see actual total parking used in a particular location or building type. Reports can be printed and shared freely.
The database is available online here: http://www.transformca.org/greentrip/parking-database.

The King County Right Size Parking Calculator allows you to view estimated parking/unit ratios for multi-family developments throughout urban areas of King County, WA (Seattle area). The calculator is based on a powerful model developed from current local data of actual parking use. It is intended to help support and guide parking supply and management decisions. The calculator is available online here: https://rightsizeparking.org/.

VALUING THE PUBLIC RIGHT OF WAY

Questions for the Panel: How can Denver identify methods and establish criteria to value (monetize, prioritize, allocate space) the public right of way and curb space, taking into account the stated priorities of the City and County of Denver and the Department of Public Works? How can the city's approach to curbside management consider existing mobility goals by prioritizing or deprioritizing (through price or space allocation) higher-capacity or more sustainable modes of travel? What are specific models that allow for private companies to utilize the right of way for transportation and for freight or commercial use through pricing and space allocation to meet broader goals?



How many people can use the curb along a block per hour by transportation mode. Graphics by Haisam Hussein; graphs courtesy Stantec's Urban Places, based on NACTO data.

The Price Must be Right

Most curb management in Denver is currently on-street parking. Denver's parking meters are over 10 years old. Significantly, Denver's parking prices are far behind those of peer cities. According to the website ParkMe.com, on-street parking prices are around $1 per hour in Denver, $2 per hour in Portland, and $4.50 per hour in Seattle.

The City of Denver hopes to eventually move to a pay station system, although there's no budget for meter technology in 2020. In the meantime, they are moving ahead with pay-by-phone technology, which does not require meters. During this transition, the panelists recommended expanding Denver's paid parking areas, adding loading zones, and implementing dynamic pricing.

Demand-Based Pricing

Demand-responsive parking pricing of on-street spaces is a critical missing gap for the city. The concept that pricing should be responsive to demand is not a new idea at all—it's a basic principle of economics. In other words, if a resource is scarce, its

"Perverse parking pricing incentivizes the wrong things."

- Chris Nevitt, Citywide TOD Manager, Community Planning & Development

"Moving people and placemaking are more important than letting people park. Parking meter rates are low and raising them would be relatively easy. Our goal is to dedicate the funding to our transit system needs."

- Ryan Billings, Transit & Corridors Planning Supervisor

price should increase, and if a resource is more plentiful, its price goes down. Why not for the public parking supply?

According to the panel, the goal of on-street parking pricing should be to ensure that every block has at least 1-2 open spaces, which would make it easy to find a parking space, resulting in reduced circling, faster transit, less double parking, more satisfied businesses, and safer crosswalks and bike lanes.

To achieve this with dynamic parking pricing:

- If the block is too full, increase the price.
- If the block is too empty, lower the price.
- If the block is just right, keep the price the same.

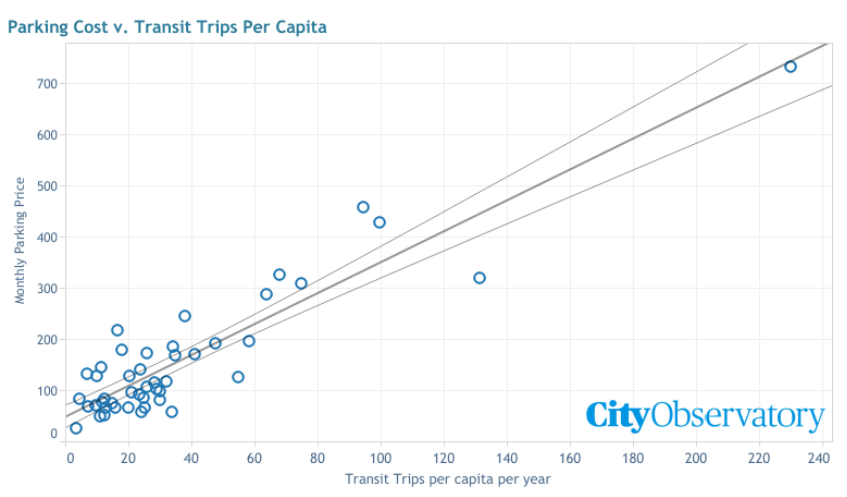
To be effective, demand-based pricing should meet the following criteria:

- Data-driven and transparent government policies
- Lowest price that achieves the parking space availability target (usually 1-2 open spaces per block)
- Maximizes customer experience of the parking system
- Improves transit reliability and overall livability of places

Dynamic pricing can be implemented gradually over time with periodic changes to match trends in demand. During the transition, on-street parking rates can be adjusted toward off-street market prices and fines can be increased.

How the Price of Parking Relates to Transit Use

We have the benefit of seeing how increasing the price of parking has affected other cities. In the City Observatory article "Cities and the price of parking" by Joe Cortright, not only was monthly parking information for US cities shared, but also this chart showing how higher parking prices are correlated with higher transit use in US cities:



"Curb space is a public amenity and it's enormously valuable. We try to be flexible with the curb space, but then there are conflicts between users. We need to look for the best public value for each location and focus on alternative modes of transportation, otherwise it doesn't work."

- Andrew Iltis, Senior Manager, Transportation & Mobility, Downtown Denver Partnership

"We want to provide as much turnover as possible to create access to curb space. Parking meter prices and fines are our biggest opportunity, especially with the possibility of dynamic pricing."

- Adam Petro, Manager of Enforcement, Right of Way Enforcement, City and County of Denver

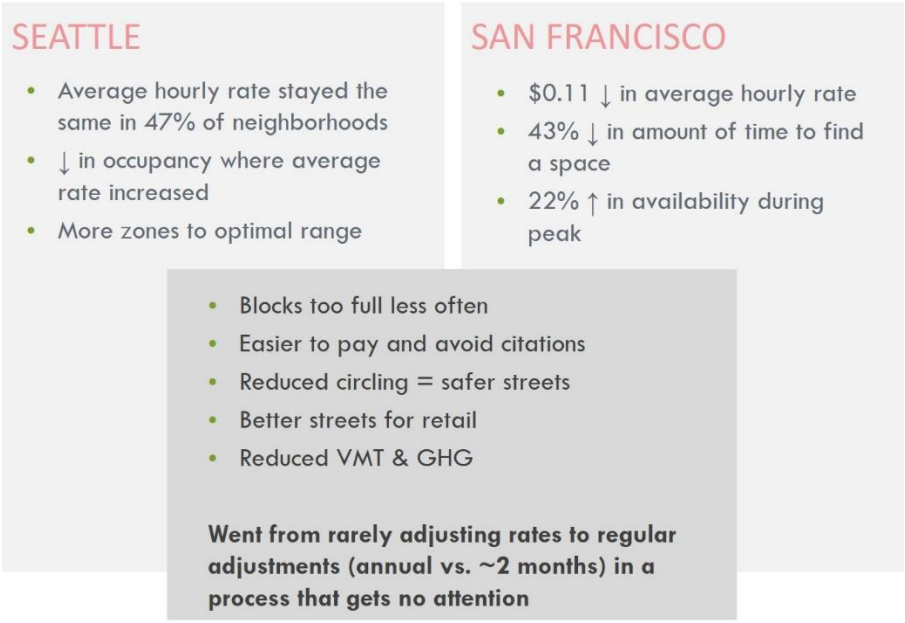
"Valet services are required to pay a lot for loading zones, and then we are legally required to share that space with taxis, Uber and Lyft, which don't have to pay. Make those companies pay for separate loading zones."

- Scott Fehler, Owner, Colorado Valets

Results of Demand-Based Parking Pricing

San Francisco piloted and then implemented demand-responsive parking pricing for all City and Port of San Francisco meters, lots, and garages in 2018. The program has been highly successful, with the following outcomes:

- SF*park* saw about a 20 percent decrease in citations. Improving the experience of parking was a focus for SF*park*, both by making it easier to find a space and making it easier to pay. By making it easy to pay, the City made it easier for drivers to avoid citations and freed up Parking Control Officers to do other things like enforce sidewalk parking or double parking.
- SF*park* saw a noticeable decrease in Parking Search Time. The average amount of time that people reported circling to find a parking space dropped by 43 percent. Less circling for parking meant a significant decrease in Vehicle Miles Traveled (VMT) and greenhouse gas (GHG) emissions.
- SF*park* saw a 16 to 45 percent reduction of how often blocks were full (over 90 percent occupancy). This goal was achieved through dynamic pricing alongside communication with customers about parking rates and locations.



The chart above includes outcomes from demand-responsive parking pricing in Seattle and San Francisco. Data courtesy SFpark.org.

Outreach Approaches

The biggest obstacle to charging for parking, at any amount, is politics. Resistance to increasing parking rates and putting a price on previously free parking is strong. Outreach approaches are key.

What has worked in other cities is outreach and feedback collection during pilot programs before expanding to citywide programs. San Francisco uses clear and simple communication with customers about demand-based parking rates and education about where parking is more and less expensive. The goal of the pilot programs and outreach is to improve customer experiences and to create an effective citywide program.

One way to overcome resistance to parking pricing is talking about how the revenue will be used.

What to Do with the Revenue

To overcome resistance to parking pricing changes, the panel noted that it's important to focus on the tangible benefits that will come out of paying the new rates. Investing the revenue locally in needed transit investments, multi-modal transportation system improvements, and enhanced customer experiences of the parking system will help people see a clear link between the money paid for parking and relevant local improvements. Signage, clear policies, and easy-to-use meters are all part of enhancing customer experiences and supporting positive public opinion.

Accomplishing these specific investments would require the establishment of a Parking and Mobility Special Revenue Fund so that the revenue doesn't disappear into the city's general fund. Since the money comes from parking meters, it is not subject to TABOR. First, the revenue should be used to reinvest in parking operations equipment and enforcement.

Parking operations equipment investments:

- Parking signage & communications
- Easy-to-use pay station system for parking
- Implementing dynamic pricing
- Expanding Denver's paid parking areas

Enforcement investments:

- Piloting loading zone enforcement with the police (roving enforcement like with parking violations)
- Real-time enforcement technology

Local or systemwide transportation investments:

- Enhanced transit service
- EcoPass subsidies
- Multi-modal infrastructure, such as crosswalks, bike paths, and loading zones
- Transportation Demand Management
- Curbside pilots (see curb management section starting on page 26 for recommendations)

"With the current residential parking program, we're kicking commuters out while residents aren't even using the parking during the day. We'd like to pilot something like what Boulder has for residential parking. We're the only agency that gives away these permits for free, and it's not helping us manage the parking situation."

- Scott Burton, Senior Planner, AMPS

Parking Violation Revenue Can Contribute to Enforcement Expenses

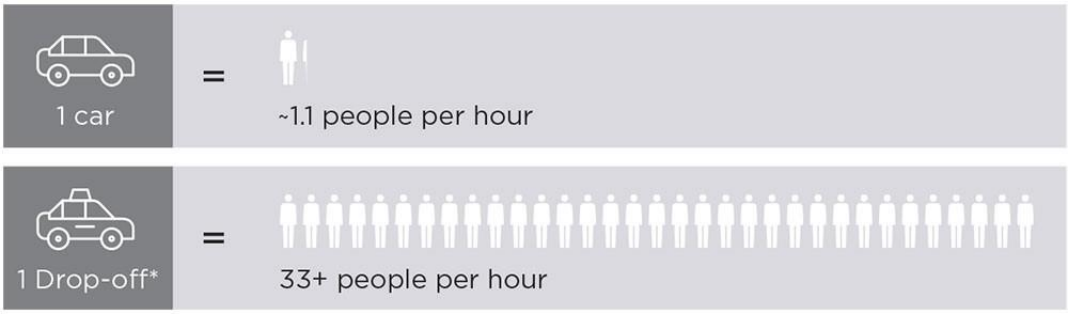
Current parking violation costs are less than paying for off-street parking, contributing to on-street parking violations. Additional violations drive up enforcement costs. While parking violations should not be overly punitive, they must be higher than the price of following the rules to disincentivize repeat violators. Tiered, progressive fines for repeat violators may be the most impactful if they are administratively feasible for the City. The panel recommended implementing any new enforcement strategies at the same time as adding new meters or pay-by-phone parking technology. Revenue from parking violations could also go into the Parking and Mobility Special Revenue Fund to help pay for enforcement.

Re-evaluate the Goal and Price of Residential Permit Parking

The panel suggested re-evaluating the goal and price of the Residential Parking Permit program in Denver, especially since free parking isn't free for the City. By subsidizing free residential parking through this program, the City supports car ownership. Panelists recommended evaluating the effectiveness of the program before expanding it and right-sizing the permit pricing to cover administrative expenses of the program.

CURB MANAGEMENT

Questions for the Panel: How can the city create a policy and program to best manage the multiple needs for goods, services, freight, and people loading that considers bike and transit lanes, public parking, and other curbside needs? How can Denver identify and establish a robust loading program that considers the varied public needs of the curbside and the needs of the companies utilizing space? How do we understand and plan for the needs of business and residents receiving goods, the companies performing the service and the city's stated goals? What tools or innovation could be utilized to ensure the city can collect payment for use?



The chart above illustrates how on-street parking allows around 1.1 person to access the curb per hour, while pick up and drop off zones allow over 33 people to access the curb per hour. Graphics by Haisam Hussein; graphs courtesy Stantec's Urban Places, based on NACTO data.

The curb is where we see all travel modes convene. Pedestrians, cyclists, scooter users, transit goers, motorists, delivery personnel, and vendors all vie for space in this slice of the public realm.

"We have a patchwork system in Denver – people don't know what to do block to block."

- Piep Van Hueven, Policy Director, Bicycle Colorado

The panel recommended focusing efforts on where the curb needs to be managed most due to competing uses—especially the downtown area where curb space is not currently maximized for all uses. To manage the curb, they suggested:

- Establish a hierarchy of curb uses
- Provide a standard template for loading zones on each block for reliable and available space for loading
- Implement dynamic pricing for curb uses
- Develop an effective enforcement program

Establish a Hierarchy of Curb Uses

"Bike lanes aren't that safe unless we can keep vehicles out of them."

- Mike Pletch, Executive Director, BCycle and Denver Bike Share

The panel recommended prioritizing access to the curb by establishing a hierarchy of uses. They suggested the following hierarchy:

1. Safety for all modes
2. Pedestrians
3. Bicyclists
4. Transit
5. Loading
6. Bike and scooter parking (optional depending on block)
7. Parklet or extended sidewalk (optional depending on block)
8. Metered parking

Provide a Flexible Template for Blocks

To implement the hierarchy of curb uses, the panel recommended starting with a flexible template for blocks that can be adjusted to account for specific curb needs and surrounding uses.

Typical blocks could include, for example:

- Pedestrian spaces
- Bike lanes and racks
- Transit lanes and stops
- Large loading zones
- Paid parking spaces with time limits (including ADA parking)

As needed uses for:

- Sidewalk enhancements like parklets and curb extensions
- Bike share parking
- Delineated parking areas for scooters
- Transit enhancements like bus bulb outs, queue jumps, and right-turn pockets
- Car share parking
- Flex loading zones and/or parking spaces for food trucks and other uses

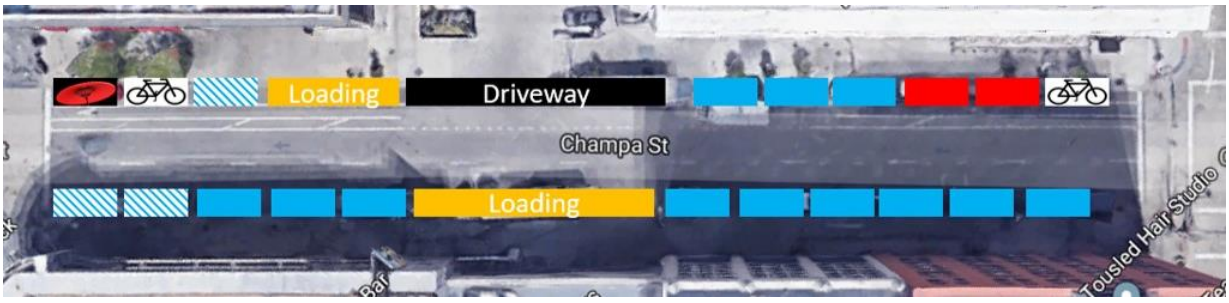
Mid-block loading considerations:

- Loading is safer away from intersections and mid-block locations allow for greater visibility
- Allow use of alleys and driveways for transitions in and out of loading zones

The graphic above illustrates a proposed street template with two bike parking spaces on either end of the block (bike images), loading zones mid-block (yellow), metered parking (blue), and as-needed uses (blue hatch). Graphic by panelist Jason Longsdorf.

"There's more e-commerce and parcel delivery than ever before, and customer expectations are higher for speed of delivery. Meanwhile, there's more bicyclists, pedestrians, and density in the downtown, and I count the illegally parked vehicles as I commute to work. Uber and Lyft vehicles wait in freight zones, so then we can't use that space for loading. We're not able to use the alleys because others are using alleys now. In Seattle, the last 50 feet of each block is for loading. Another possibility is allowing companies to reserve freight zones ahead of time."

- Gregory D. Fulton, President, Motor Carriers Association



Champa Street in Denver is shown as an example of how the flexible street template could be applied to an actual street. The graphic above shows two bike parking spaces on either end of the block (bike images), loading zones mid-block (yellow), a parklet (umbrella), a bus stop (red), metered parking (blue), and as-needed uses (blue hatch). Graphic by panelist Jason Longsdorf.

Implement Dynamic Pricing & Enforcement of Curb Uses

Dynamic demand-based pricing can be implemented for curb uses similarly to how it is used for parking. Apps like curbFlow allow businesses to rent curb space, and digital solutions like this could integrate demand-based pricing.

Enforcement of curb uses could move from manual to technological solutions, such as from roving police enforcement to cameras with use and/or license plate recognition at key locations. Geofencing can establish virtual geographical boundaries within which certain curb uses—like TNC pick-ups and drop-offs—are permitted. Video and geofencing technology can be used to monitor specific areas with high demand, like loading zones in the downtown, and charge for and enforce curb uses within those areas. Several companies offer this technology, including Automotus, Cleverciti, and Unleash Live.

While technology could be piloted and tested in specific high demand areas, there are many low-tech solutions that could be used as well throughout the city. Physical markings on the curb, like paint and signage, could be used for loading zones and TNC pick-up and drop-off areas. As an example, many cities have allowed businesses to print their own loading signs for curbside pick-ups during the COVID-19 shutdowns. Denver recently released a Request for Qualifications for aggregating micro-mobility contracts, which could allow for more streamlined payments, management, and coordination of scooters, bike share, and other micro-mobility options citywide. Creating an organized, coordinated system for curb uses, payments, and enforcement is a goal that can be achieved through experimentation, tracking, and refinement over time.

> "In terms of creating designated zones for rideshare pick up and drop off, it starts with the rider since the driver goes where rider's pin is. Physical signage that shows riders where to go has worked in specific areas like airports and Denver Union Station. The requirements are that 1) you have to feel safe – and infrastructure is a big part of safety, and 2) it has to be reliable. Any additional charges are passed on to riders."
>
> - Joseph Sanfilippo, Uber

Flexibility in Curb Management

Uses for and pricing of loading zones can change throughout the day to accommodate demand. Walker Consultants gave the following examples of how allowed uses could be managed throughout the day:

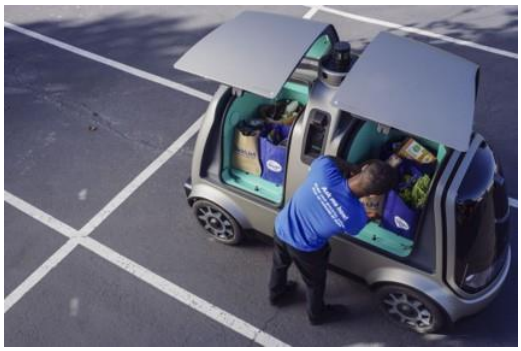
- **Early Morning:** Freight and commercial deliveries
- **Mid-Morning:** Parklet use, employee pick-up and drop-off
- **Mid-Day:** Deliveries and street vendors; micro-mobility usage for errands and meetings
- **Evening:** Maximize travelway capacity for after-work travel
- **Night:** Commercial deliveries

Source: "Managing Your Valuable Curb Space" by Walker Consultants.

Loading Zones Become Opportunities to Experiment

The panelists encouraged the City to experiment with loading zones to see what works best.

- Start by observing existing uses of the curb to understand demands and conflict points, as well as physical conditions. Collect both data and qualitative feedback about what works and what doesn't work.
- Experiment with allowed loading zone uses throughout the day based on demand (see "Flexibility in Curb Management" on page 28 for more information).
- Test reservation systems like curbFlow, which is an app that allows businesses to rent curb space for a designated period of time. The app is currently being used in Washington D.C. and Columbus, Ohio.
- Geofence and implement demand-based pricing for curb use in high demand areas with technologies like Automotus, Cleverciti, or Unleash Live.
- Pilot curb use enforcement with roving police and/or with video technology such as those listed above. Implement curb enforcement incrementally, starting with signage, warnings, and grace periods. Establish mutual benefit in communications and outreach with the public (for more information, see page 36).
- Encourage delivery services to test smaller vehicles with fewer emissions.



From top left to bottom right: curbFlow manages curb loading for commercial operators, photo via Washington Post. Kroger and Nuro launched their driverless grocery delivery service in 2018, photo via The Verge. UPS' pedal-electric eBike can go where few other delivery vehicles could, photo via FleetOwner. Companies are exploring package delivery with drones, photo by Claude Paris via AP Images.

KEY TAKEAWAYS

Key Recommendations

Right-Sizing the Off-Street Parking Supply

- Track the outcomes of parking maximums at River Mile and gauge receptivity to parking maximums in other transit-rich areas. Consider piloting flexible maximums, which send market signals without the downsides of strict parking maximums.
- Remove parking minimums
- Allow shared parking & parking districts
- Adopt and implement Denver's Transportation Demand Management (TDM) plan
- Increase investments in transit and multi-modal transportation systems & allow temporary parking in the meantime
- Require higher development density & mixed-use in transit-rich areas
- Provide resources to "prove the case" for lower parking

Valuing the Public Right of Way

- Implement demand-based parking pricing
- In the meantime, adjust on-street parking rates to be closer to off-street parking prices and increase fine costs
- Use pilot programs and outreach to improve customer experiences and develop effective programs
- Use increased parking revenues and violation fines to fund enforcement, parking, and mobility projects that reduce SOV/VMT/GHG
- Overhaul and charge for Residential Parking Permit Program

Curb Management

- Establish a hierarchy of curb uses
- Provide a flexible template for blocks
- Implement dynamic pricing for curb uses
- Enforce curb use regulations
- Experiment with curb management in loading zones

"We're less than 4 percent of VMT in the state. We want to get to the point in which no one feels like they need to own a private vehicle. Comfort, ease, and affordability are important, but solving the mountain route issue here is the goal. The Lyft app was recently redesigned to show cars, scooters, and transit. To make rideshare work across the city, we focus on problem areas: stadiums when everyone leaves at once, airports, major venues, Union Station. More people take the major transportation routes, but they need solutions for low-density areas."

- Gabe Cohen, Lyft

"We want age-friendly and livable communities with complete streets. We need safer bike lanes, pedestrian crossings, and transit access."

- Roberto Rey, Associate State Director, Multicultural Outreach, AARP

Advice from *The High Cost of Free Parking*

In his book *The High Cost of Free Parking*, Donald Shoup recommends three parking reforms that can improve cities, the economy, and the environment:

- **Remove off-street parking requirements.** Developers and businesses can then decide how many parking spaces to provide for their customers.
- **Charge the right prices for on-street parking.** The right prices are the lowest prices that will leave one or two open spaces on each block, so there will be no parking shortages. Prices will balance the demand and supply for on-street spaces.
- **Spend the parking revenue to improve public services on the metered streets.** If everybody sees their meter money at work, the new public services can make demand-based prices for on-street parking politically popular.

"Parking demand studies with data would allow for change. We'd share parking demand data--we do that all that time for rents. For parking utilization studies, we need to study developments that are fully occupied, not ones that are currently leasing up."

- Kirsty Greer, McWhinney

Data Collection & Analysis

To make headway on the recommendations above, data is critical:

- Parking utilization information would allow for the right-sizing of parking supply
- Dynamic pricing requires current data about demand
- Managing curb space demands knowledge about who is using the curb and when
- Ongoing data collection and analysis helps to determine the effectiveness of treatments and how to troubleshoot them

"Developers typically don't have parking utilization information to know how much parking is actually available. They're just looking at competitors' ratios. They should start collecting utilization info now to make the case for lower parking ratios."

- Scott Rathbun, Apartment Appraisers & Consultants

A common trend, however, is that local governments lack relevant, up-to-date data and private companies that have it typically aren't eager to share.

Parking Utilization Information

For parking utilization information, the City could start a program that requires property owners to collect and share their parking utilization data. With this information, stronger cases could be made for lowering parking ratios, removing parking minimums, sharing parking, and unbundling parking.

"We have no idea about parking supply off street. We recommend less parking but need to provide supporting data."

- Chris Nevitt, Citywide TOD Manager, CPD

Technology for data collection and management of parking is widely available. Cameras and sensors are used to monitor vehicle presence within parking spaces and Automated Parking Guidance Systems and mobile applications can be used to alert drivers about real-time parking availability, which can reduce circling for parking and associated emissions. These systems can also help with ongoing data collection and analysis of parking utilization. Companies that offer this technology include Parking Guidance Systems LLC, Park Assist, Indect, and Parksol USA, among others.

Data for Demand-Based Pricing and Curb Management

> "We want to see dynamic pricing and turnover in the downtown, but we don't have real-time data. We could collect relevant data with a License Plate Recognition system."
>
> - Ryan McCann, Manager of On-Street Programs, City and County of Denver

The move from manual to technological data collection for citywide demand-based pricing and curb management is currently a cross-sector race.

NACTO's SharedStreets and Alphabet's Coord, much like Populus' Mobility Manager, Ford's Transportation Mobility Cloud "Autonomic," Amazon Web Services' "City Transformation" technology, Siemens' Intelligence Platform "MindSphere," and IBM's Smarter Cities, are racing to help cities map the curb, which could not just transform cities, but also result in substantial profits.

While a shared platform that collects, integrates, and analyzes relevant data is needed for desired outcomes, cities should be thoughtful about which platform they select.

Already, HDR has mapped West Colfax's curb features—including bus stops, parking signs, fire hydrants, curb cuts, and curb paint—in Coord's platform "Open Curbs," which launched in April 2019. The data was collected with the free Coord Collector app, which uses augmented reality to identify objects on the curb and add them to a digital map. Coord's Open Curbs is designed to work in concert with a paid product that the company sells to mobility companies: the "Curbs API," which contains the rules and regulations that enforce curb access, including dynamic pricing. As an example, TNC drivers that subscribe to the API can be notified via smartphone when they've been waiting too long in a loading zone. Coord will also sell the locally collected data to other companies, allowing it to be used across cities and sectors.

In 2018, the National Association of City Transportation Officials (NACTO) and the nonprofit Open Transport Partnership announced the launch of SharedStreets, an open source transportation data platform that allows cities to work with companies to manage the right of way. SharedStreets provides open source software, digital infrastructure, and governance frameworks that enable public-private collaboration and the seamless exchange of transportation data. *In addition to its functionality, an advantage of using SharedStreets is that it is managed by a nonprofit—a data-holding third party between cities and private companies, giving greater peace of mind to both sides by protecting privacy and providing information in a usable form to cities for planning purposes.*

So far, Uber has been working with SharedStreets to build a tool that will process and aggregate private companies' data, put it in the correct format, and leave it completely anonymized. Local governments can then use that anonymous data to know how often and when vehicles pick up and drop off at locations throughout their cities. SharedStreets is now working on partnering with more organizations—bike share and e-scooter companies, car shares, TNCs, delivery services, and even automakers. The open source SharedStreets platform uses a referencing system to aggregate trip data onto shared maps that anyone can use.

Overall, cities must ask themselves to whom they're willing to hand over information, why, and with what limits or protections. Kevin Webb, the co-director and co-founder of SharedStreets, said, "It's important to articulate the values around why cities should retain control of the public space and revenue streams rather than handing it off to a private company."

Equity & Fairness

Equity refers to the fairness with which impacts – both positive and negative – are distributed across populations. Access to and price of transportation options are important equity concerns.

"Cheap parking isn't necessarily equitable. The right of way is for everyone, not just drivers."

- Chris Nevitt, Citywide TOD Manager, Community Planning & Development

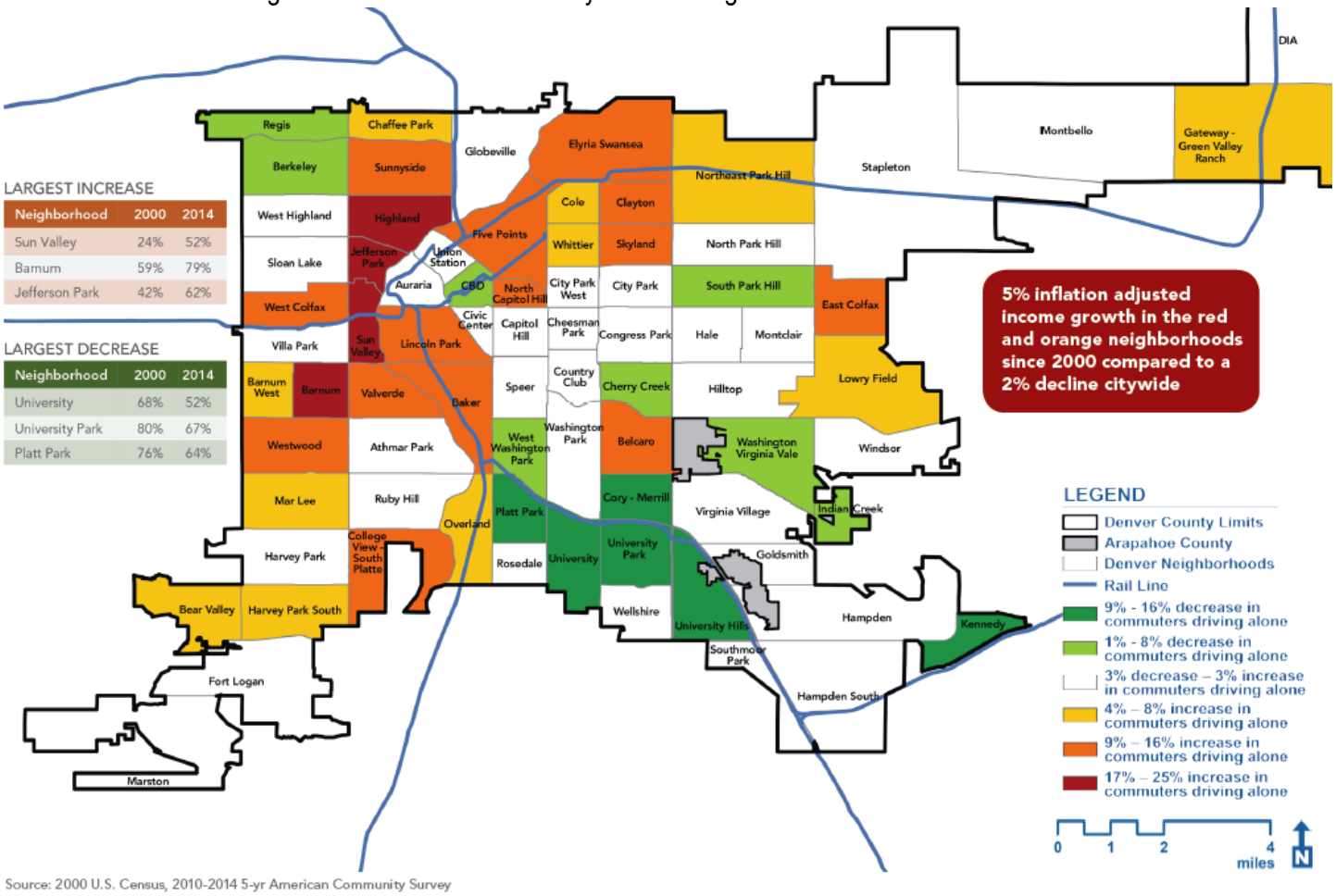
Traditionally under-served populations such as low-income individuals, people of color, and women may have unique transportation needs that should not be overlooked, especially if the City hopes to reduce single occupancy vehicle commuting and associated greenhouse gas emissions.

As an example, Metro in LA released the study "Understanding How Women Travel" in 2019. The report's findings confirm that women have different mobility needs, travel patterns, and commute demands than men, and some women feel unsafe using transit for a variety of reasons.

While increasing the price of parking may seem like a serious issue for low-income individuals, focusing on increasing access to convenient and affordable transit would be a much better solution than requiring everyone to own and maintain a car, on top of paying for parking.

Communities of color have been experiencing involuntary displacement throughout metro Denver, pushing them farther from convenient access to transit and jobs.

2000-2014 Change in Drive Alone Commute by Denver Neighborhood



Source: 2000 U.S. Census, 2010-2014 5-yr American Community Survey

The map on page 33 from the *Blueprint Denver Diagnostic* shows the change in commuters who drive alone by Denver neighborhood between 2000 and 2014. The five percent income growth in orange and red areas compared to the two percent decline citywide illustrates the gentrification and likely displacement occurring in those Denver neighborhoods. The neighborhoods with income growth are also seeing an increase in driving alone, despite having access to transit options and relative proximity to the downtown.

Low-income people use transit most often, but they have had to move farther from quality transit than people with higher incomes.

What's Contributing to Transit Ridership Loss?

For their new report, "Who's on Board 2019," TransitCenter surveyed 1,700 transit riders in seven American cities, including Denver. They asked: How have you changed your transit riding habits over the past two years, and why? The answers illuminate why transit use has fallen and how transit agencies can win back riders.

RTD's annual boardings have fallen from around 103 million in 2014 to around 95 million in 2019, despite a rapidly growing population. Regular RTD riders used transit 30 percent less on average compared to two years ago, according to the Transit Center survey. Reasons cited for the decline include cheap cars loans and lower gas prices, which makes driving less expensive. Uber, Lyft, and scooters offer new mobility options. But these are excuses according to TransitCenter, since cities with increasing transit ridership also have these environmental factors.

According to the survey, just 35 percent of RTD's riders continue to rely on the system in the same way they did two years ago. 44 percent of respondents abandoned or decreased taking transit. Of all the respondents, 27 percent moved in the past two years, and among these movers, people with household incomes below $25,000 moved to areas with a significant decrease in transit quality.

In the cities where transit ridership has increased, the transportation networks of connected rail and bus lines focus on the areas where the most people live, work and play. By contrast, Denver has invested billions since 2004 in a regional rail network that extends far and wide, even into communities that did not want public transit. Meanwhile, RTD and Denver have not expanded service in the areas where it's used the most.

"If you're interested in ridership, you should be interested in where people are and where they want to go," said David Bragdon, who worked on the report. "A transit plan that's drawn to appeal to the voters in a ballot measure is not the same thing as a transit plan that's designed to really serve lots of riders."

"Transit riders want reliable and frequent service in Denver," said Mary Buchanan, a report author. "They don't want to be waiting for the bus forever."

The City and County of Denver can help RTD by designing the right of way to move buses faster and to make bus stops easier to walk to and use. Boulder and Seattle pay the regional transit agency to provide a higher level of service within their city

Mode	Denver
Transit	↓ ↓
TNC	↑
Car	↑ ↑
Taxi	∿
Carshare	↓
Telecommuting	↓
Bike	∿
Walking	↓ ↓

n=1,238 (Respondents who did not move)
↑ ↑ indicates absolute change of 1+ days;
↑ indicates absolute change of 0.1-1 days;
∿ indicates absolute change less than 0.1 days

Chart above indicates change in mode ridership in 2019. From page 21 of "Who's on Board 2019" by TransitCenter.

"We want to provide mobility and connections, especially since not everyone has the means to pay for parking. How do we plan and park for the future?"

- Ryan Tobin, Director of Real Estate, Denver Housing Authority

"We're working on mobility hubs and statewide transit. Reliable transit is an important piece of reducing parking needs. We've been studying front range rail along I-25."

- Sophie Shulman, Office of Innovative Transit, Colorado Department of Transportation

limits. “The suburbs get one level of service commensurate with their needs, and then the city has a higher level of service,” said Bragdon. Denver must help fund the high-frequency network it proposed in Denveright if it wants all the desired outcomes stated.

Sidewalk Completion in Low-Income Areas Compared to Denver

Low-income areas have fewer sufficient sidewalks than the rest of the city.

	Percent of Sidewalk	
	Low Income Areas	Entire City
Sufficient width (>4’)	53%	60%
Deficient width (<4’)	34%	30%
Missing	13%	10%

While there are fewer sufficient sidewalks in low-income areas than the rest of Denver, low-income individuals require greater access to transit than others. Walkability and ADA accessibility to transit involves sidewalks. Graph courtesy *Denver Moves: Pedestrians & Trails.*

Who Uses Loading Zones?

A frequent topic that came up in interviews was that TNCs like Uber and Lyft frequently use loading and valet zones, but don’t pay for their use of the curb like freight and valet companies do. One option is to reassess permits and fees, although TNCs will pass through any fees to their riders.

Georgetown University's Kalmanovitz Initiative for Labor and the Working Poor recently released findings from its ongoing study, "The Uber Workplace in DC," showing that half of the TNC drivers they interviewed had monthly incomes below the federal poverty line. Drivers fear that additional fees might hurt their incomes further.

Washington DC, Philadelphia, Chicago, and South Carolina have all imposed new taxes and fees on ridesharing, generating millions for transit, roads, enforcement, and education. TABOR has prevented Colorado from pursuing a similar tax on TNCs so far. In addition to a 6 percent tax, Washington DC requires TNCs to share anonymous data with government agencies, which may be a good starting point for Denver. Uber already provides such data to SharedStreets, but this could be a good opportunity to add other TNC data as well.

Recommendations Related to Equity & Fairness

Overall, the recommendations in this report attempt to account for equity and fairness in the following ways:

- **By reducing the required amount of parking in new developments**, the costs passed through to tenants will also decrease—since parking is extremely expensive to build. This could help to increase housing affordability citywide.
- **Monetizing curb access** can generate revenue to further invest in transit and multi-modal options, TDM services, and infrastructure for underserved neighborhoods.
- **Creating a robust loading program and managing the curb** is important for creating access to the curb for low-income gig economy drivers who would suffer disproportionally from higher-cost violation fines if well-defined and managed loading zones are not established.

Outreach & Education

Changes to the amount and price of parking and to curb access will require communication, ambassadorship, and transitional enforcement to adjust behaviors. Pilot programs that test the efficacy of selected treatments can help with the outreach and education process, while also allowing opportunities for feedback and improvement. Technology, signage, and mobile applications can be used to enhance user experiences by making it easier to find open parking spaces, compare parking prices in different locations at different times of day, and to find diverse mobility options that allow people to reach their destinations efficiently and comfortably.

An important strategy for overcoming resistance to change is to clearly establish mutual benefit. Share ways in which the changes to parking supply and pricing support the city's climate goals, result in cleaner air, and reduce traffic for all. Invest the additional parking revenue into enhanced transit and mobility systems. Give the people what they want on curbs by paying attention to their diverse needs and reducing conflicts between uses. *Organizing the right of way is a great opportunity for enhancing the public realm and people's experiences of cities.*

Future Changes in Transportation Funding

Transportation funding has been a challenge at the state level for years. With increased vehicle fuel efficiency resulting in less gas tax revenues, increased population and VMT creating more wear and tear on the roads, and declining purchasing power with the value of the dollar worth half of what it was in 1991 when the gas tax was last raised, CDOT is facing a $25 billion funding gap over the next 25 years.

As the transportation system changes, new funding models may become more accessible. Examples include regional congestion pricing, VMT fees, TNC fees, and loading fees. Trip-based fees like these could eventually replace the gas tax and reduce VMT and GHG emissions by disincentivizing car use.

Denver's parking meters are over 10 years old and Denver's parking prices are far behind those of peer cities. The City of Denver plans to move to a pay station system, although there's no budget for meter technology in 2020.

Bus only lanes in downtown Denver allow for greater transit efficiency throughout the city.

V. Conclusion

Cities around the world are in the midst of rapid change. Not just in response to climate change, but also hand-in-hand with unprecedented technological development. This is our opportunity to leverage that technology for the betterment of humankind.

Parking and curb management may not seem like topics that are vital to our future, but they are actually keys to shaping our cities, our travel behaviors, and our carbon footprints. Buildings and transportation are the two largest contributors of greenhouse gas emissions, and cars influence both significantly.

As we shape the future of our city, let's focus on requiring what we want (like bike and pedestrian infrastructure and convenient transit) rather than what we don't want (like superfluous parking). Smart cities can build data networks that support greater efficiencies and focus on human needs. Ultimately, we may need to move away from the gas tax as a revenue source and transition existing parking for other uses, both of which could open new possibilities.

The City and County of Denver is prepared for these changes. It has recognized the challenges and set ambitious goals for emissions reductions. The next step is implementation.

"We're not in the parking preservation business. What is the highest and best use of the curb?"

- Scott Burton, Senior Planner, AMPS

VI. Stakeholders

Stakeholders Who Participated in the Workshop

Public Works Staff

- Adam Petro, Manager of Right of Way Enforcement
- Ryan Billings, Transit and Corridors Planning Supervisor
- Gandrie Apriandito, Transit and Corridors Planning Fellow
- Scott Burton, Senior Planner, AMPS
- Ryan McCann, Manager, On-Street Programs

City and State Staff

- Chris Nevitt, Citywide TOD Manager, Community Planning and Development, City and County of Denver
- Chris Gleissner, Development Projects Manager, Community Planning and Development, City and County of Denver
- Abe Barge, Community Planning and Development, City and County of Denver
- Sophie Shulman, Colorado Department of Transportation

Neighborhood and Transportation Representatives

- Gregory D. Fulton, President, Motor Carriers Association
- Andrew Iltis, Senior Manager, Transportation & Mobility, Downtown Denver Partnership
- Frank Locantore, Executive Director, Colfax Ave Business Improvement District
- Ryan Tobin, Director of Real Estate, Denver Housing Authority
- Mike Pletch, Executive Director, BCycle

Developers and Investors

- Scott Rathbun, Apartment Appraisers & Consultants
- Ryan Sahd, First Bank
- Kirsty Greer, McWhinney
- George Thorn, Mile High Development
- Matt Mahoney, Revesco Properties

Transportation Representatives

- Joseph Sanfilippo, Uber
- Gabe Cohen, Lyft
- Amit Ginsberg, Lyft
- Celeste Stragand, Ford Mobility
- Scott Fehler, Owner, Colorado Valets
- Peter Krahenbuhl, CEO / Executive Director, eGo CarShare

Community and Nonprofit Representatives

- Piep Van Hueven, Policy Director, Bicycle Colorado
- Roberto Rey, Associate State Director, Multicultural Outreach, AARP
- Gina Volpe-Beasley, council aide, Councilmember Sandoval
- Kathleen Gile, council aide, Councilmember Black

VII. ULI Volunteer Panelists

Panel Chair Lauren Mattern, Principal, Nelson\Nygaard

Lauren is an industry expert on the intractable role of parking within the built environment and public health realms and provides expertise on multimodal planning and transportation management strategies. Lauren previously served as Manager of Parking Policy and Technology at the San Francisco Municipal Transportation Agency, helping bring SF*park*, a new type of parking and demand management system, to life. The pioneering $42M project changed the parking management field, successfully reducing circling and emissions in pilot areas. It won major kudos for its innovation and impact, including from the Institute for Transportation and Development Policy, Harvard Kennedy School, and the International Parking Institute.

Charlie Alexander, Principal, Denver Office Leader, Fehr & Peers

Charlie earned his bachelor's degree in Civil Engineering from Bucknell University, is a registered Civil Engineer in Colorado, California and Washington, and is certified by the American Institute of Certified Planners (AICP). Charlie has a variety of Complete Streets project experience including pedestrian and bicycle master plans, pedestrian and bicyclist safety projects, bikeway and walkway designs, corridor designs, Safe Routes to School projects, Safe Routes to Transit projects, roadway "right-sizing" (i.e. road diet) studies, crosswalk policies, and bike share studies. Previously, Charlie was in the Fehr & Peers' Sacramento office. During that time, he was the on-call transportation engineer for the University of California, Davis where he worked closely with campus planners, architects and engineers to improve bicyclist circulation and safety.

Jenny Jacobs, Director of Development, East West Partners

Jenny manages the development of The Coloradan in Union Station, which has an innovative flex parking garage in the heart of downtown Denver. Since graduating from Harvard University with a bachelor's degree in economics, Jenny has led a career focused on finance and development. She worked as an analyst in the Real Estate Investment Banking group at Lehmann Brothers and later at Barclays Capital in New York. From there, Jenny served as a Vice President at Amstar, where she was responsible for managing development, underwriting, acquisition, asset management, and disposition for a variety of property types. Throughout her career, she has completed IPOs, M&As, sale, and financing transactions in excess of $5 billion. She is the co-chair of ULI Colorado's Young Leaders Group.

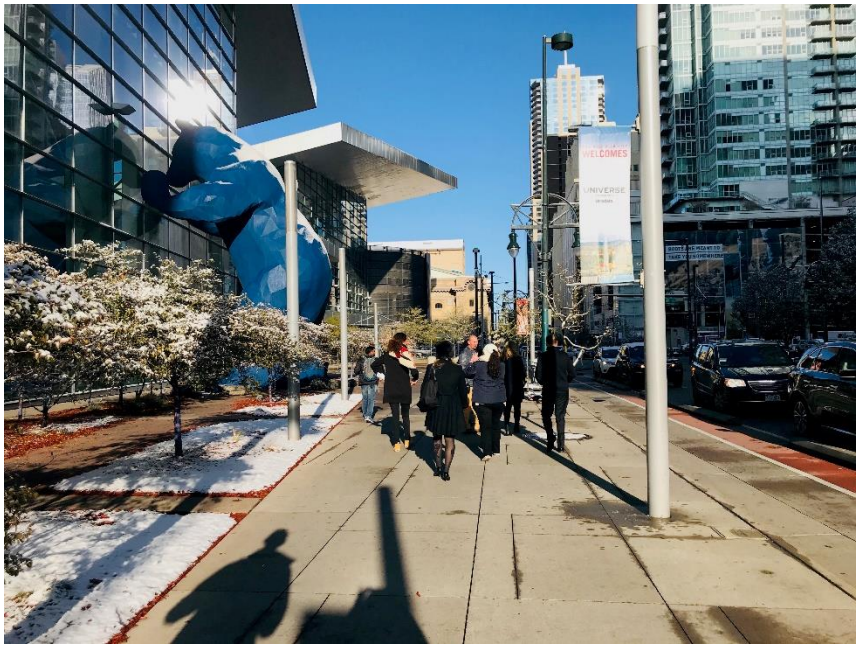
Jason Longsdorf, Senior Transportation Planner, HDR

Jason Longsdorf leads HDR's 30-person transportation planning group in the Denver office. He has 20 years of experience with transportation planning on transit and roadway projects and has developed comprehensive planning documents for bicycle and pedestrian programs. Recently, Jason has been focused on emerging mobility technologies and urban mobility. He is leading a team to develop "Denver Moves: Downtown" for the City and County of Denver including a detailed analysis of projects that will help Denver increase mode split for transit, bike and pedestrian travel. Prior to joining HDR, he was a transportation planner with the City and County of Denver (CCD) Department of Public Works and an environmental protection specialist with the CCD Department of Environmental Health.

Jeremiah Simpson, Parking and Mobility Planner, Kimley-Horn

Jeremiah is a Parking and Mobility Planner for Kimley-Horn. He has been working in the industry for over 18 years, providing mobility solutions for public and private sector clients. His areas of expertise include parking needs studies, mobility master planning, shared parking, transportation demand management (TDM), financial analysis, parking and development policy, due diligence, zoning, site selection, access and revenue control, and wayfinding. Jeremiah is passionate about how new technologies are impacting our urban environments. Jeremiah believes that technology must be leveraged to make our transportation systems more efficient to help mitigate the negative impacts of global climate change.

Special thanks to the ULI Colorado TAP Committee Chairs Al Colussy, Andrew Knudtsen, LaDonna Baertlein, and Anna Jones and to the sponsorship and partnership of the Bloomberg Philanthropies American Cities Climate Challenge, ULI Center for Sustainability and Economic Performance, and Natural Resources Defense Council.



ULI Colorado Leadership in Responsible Land Use

ULI Colorado is the 1,300-member District Council of the global Urban Land Institute. ULI Colorado consists of a four-person staff, 25-member executive committee, and 15 committees with more than 250 volunteers. More than 40 programs a year include advisory panels, leadership and mentoring programs, panels, project tours, publications, and community service. ULI is a non-lobbying educational and research institute supported by its members, sponsors, and foundations. Key issues include affordable housing, healthy communities, transit-oriented development, and sustainable design and planning.

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