City of Lawrence

TRANSPORTATION COMMISSION STUDY SESSION
Monday, August 5, 2019 5:00 PM
City Commission Room, City Hall, 6 E. 6th Street

- Receive information on regulations for electric and motorized vehicles
- Receive request from VeoRide to amend bike share contract to include e-scooters

TRANSPORTATION COMMISSION REGULAR MEETING
Monday, August 5, 2019 6:00 PM
City Commission Room, City Hall, 6 E. 6th Street

1. **Approve Regular Meeting minutes for July 1, 2019**

2. **General Public Comment**
   The public is allowed to speak to any items or issues that are not scheduled on the regular agenda. Public comment will not be received for Staff Items, Commission Items, or Calendar. Each person or organization will be limited to three (3) minutes. As a general practice, the Commission will not discuss/debate these items, nor will the Commission make decisions on items presented at this time. Individuals are asked to come to the microphone, sign in, and state their name and address. Speakers should address all comments to the Commission.

3. **Lawrence Bikes Plan**
   Action: Recommend approval of the Lawrence Bikes Plan
   http://assets.lawrenceks.org/assets/mpo/bicycle/BikePlan-Draft.pdf
   Public comments were received during the public comment period May 15-June 14
   http://assets.lawrenceks.org/assets/mpo/bicycle/BikePlan-Comments-MPOResponses.pdf

4. **Non-Motorized Project Prioritization**
   Action: Approve Non-motorized Project Prioritization Policy TC19-001 and recall Non-motorized Projects Prioritization Policy TC18-001.

5. **Staff Items**
   - Update on 2019 Pedestrian Bicycle Funding Allocation

6. **Commission Items**
   - Update from Commissioner Kuzmyak on PTAC

City of Lawrence

7. Calendar

- **<u>Next Meeting September 9, 2019</u>**
- 5p Study Session:
  - Transportation/Land-Use Relationship
- 6p Regular Meeting:
  - E. 23rd Street Planning Study

8. Adjournment

Memorandum
City of Lawrence
Municipal Services & Operations

TO: Transportation Commission
FROM: Dave Cronin, City Engineer
DATE: July 24, 2019
RE: August 5, 2019 Study Session – Micromobility/E-scooters

Background

Micromobility is a term used to describe emerging forms of transportation based around electric "e" vehicles, primarily used for first/last mile trips. E-vehicles include e-scooters, e-bikes, motorized skateboards and other mobility devices defined in the Kansas Standard Traffic Ordinance (STO). Attached is a reference sheet of regulated devices.

On June 4, 2019 the City Commission referred a request from VeoRide, Inc. to expand the bike share program and implement e-scooters to the Transportation Commission for review and recommendation. Staff received a subsequent request from a representative of Bird to also bring e-scooters to Lawrence.

Regulation of E-scooters

The State of Kansas recently passed Senate Bill 63 regulating the use of e-scooters, which are defined by the bill as every self- propelled vehicle having at least two wheels in contact with the ground, an electric motor, handlebars, a brake, and a deck designed to be stood upon while riding. The bill amends the Uniform Act to prohibit any person from operating an e-scooter on any interstate highway, federal highway, or state highway. The bill permits the governing body of a city or county to adopt an ordinance or resolution further restricting or prohibiting the use of e-scooters on public highways, streets, or sidewalks within such cities or counties. The bill applies traffic regulations applicable to bicycles to e-scooters. The bill does not prohibit e-scooters from crossing a federal or state highway. The bill adds a fine of $45 for unlawful operation of an e-scooter. The bill also includes the new definition of e-scooter in vehicle registration statutes. The bill excludes e-scooters from registration.

Considerations for adopting a local ordinance on e-scooters

If the city adopts an ordinance to permit e-scooters there are several factors to consider:

- Should the city solicit an RFP to select one vendor for all micromobility (bike share/e-bikes/e-scooters/etc.)?
- Should a 1-year pilot program be implemented first? Should the City partner with KU?
- Should e-scooters be allowed on sidewalks? Should they be allowed downtown?
- Should there be an age requirement? Helmet requirement?
- Should there be speed restrictions? Time of day restrictions?

- Should there be parking restrictions?

Link to area cities e-scooter program and ordinances:

Wichita, KS
Topeka, KS
Kansas City, Missouri
Columbia, Missouri

Consideration for other electric personal mobility devices

In February staff received a request from a KU student regarding the use of electric skateboards in the city. Motorized skateboards as defined in the STO are unlawful for any person to operate on any street, road or highway (STO Sec. 109-1). The use of other devices such as hover boards, balancing boards and other personal mobility devices are becoming more noticeable in the community.

- Should the city implement an ordinance that allows other electric mobility devices?

Action
Receive information and provide feedback.

Attachments
Reference of Transportation Devices defined in Kansas Standard Traffic Ordinance (STO).
"Micromobility in Cities: A History and Policy Overview". National League of Cities
Herman, Mason (2019). A Comprehensive guide to electric scooter regulation practices.
Veoride Request (4/30/2019)
Motorized Skateboard Correspondence

Scooters for Lawrence

And Operational Renegotiation

VeoRide

Single Occupancy Vehicles

- 83.4% of people in Kansas City commute in a single occupancy vehicle.
- 79% Nationwide
- Unnecessary emissions
- 58,829 reported car accidents in 2017 (statewide)
- 1 death every 19 hours (statewide)
- Parking

http://demographia.com/db-jtwmma2012.pdf
https://www.ksdot.org/Assets/wwwksdotorg/bureaus/burTransPlan/prodinfo/2017factsbook/QuickFacts.pdf

Scooters vs SOV

- Portland case study
- 2,000 scooters, 120 days
- 700k trips, 800k miles
- 61% positive view
- 71% used for transportation
- 34% of residents would have otherwise driven
- 48% of visitors would have otherwise driven

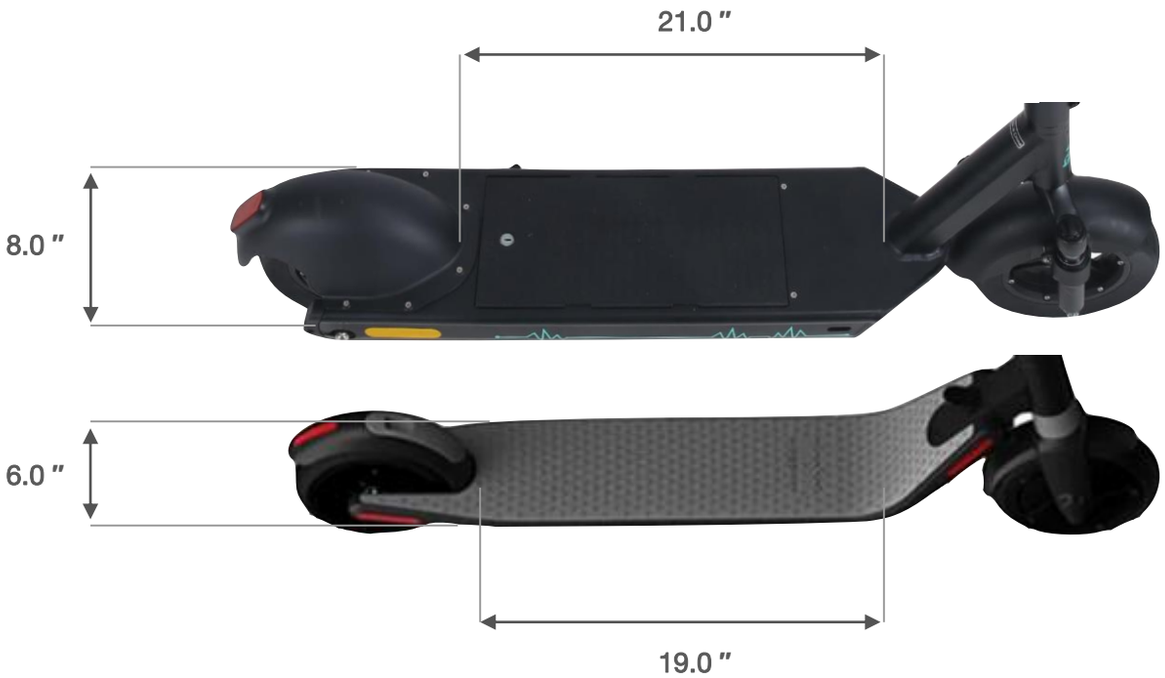
https://www.portlandoregon.gov/transportation/article/709719

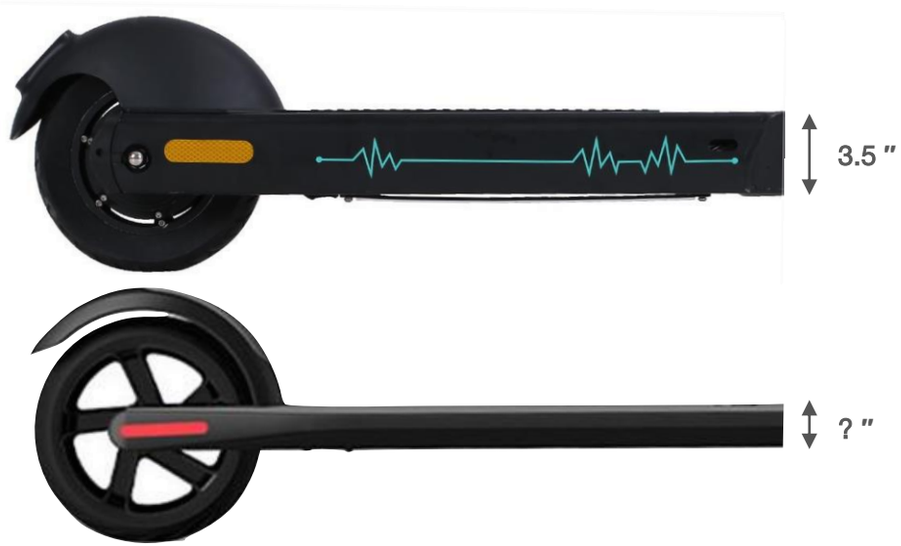
Why VeoRide?

- Established Operations
- Local team
- Multi-modal fleet
- Better scooter
  - 10” wheels
  - Suspension
  - Mechanical brakes
  - Swappable battery
  - Low center of gravity
  - Front, rear, and under carriage lights
- CDC report
- Competitors’ scooters

https://qz.com/1561654/how-long-does-a-scooter-last-less-than-a-month-louisville-data-suggests/
https://www.austintexas.gov/sites/default/files/files/Health/Epidemiology/APH_Dockless_Electric_Scooter_Study_5-2-19.pdf

Sturdy Platform – Suitable for All Riders





Wider Platform Area for All Riders

VeoRide's Scooter: **168 in²**
Competitors' Scooter: **114 in²**

Weight Limit:

VeoRide's Scooter: **300 lbs**
Competitors' Scooter: **200 lbs**

Big Wheels, Two Suspensions, and Disc Brakes

Larger Wheels

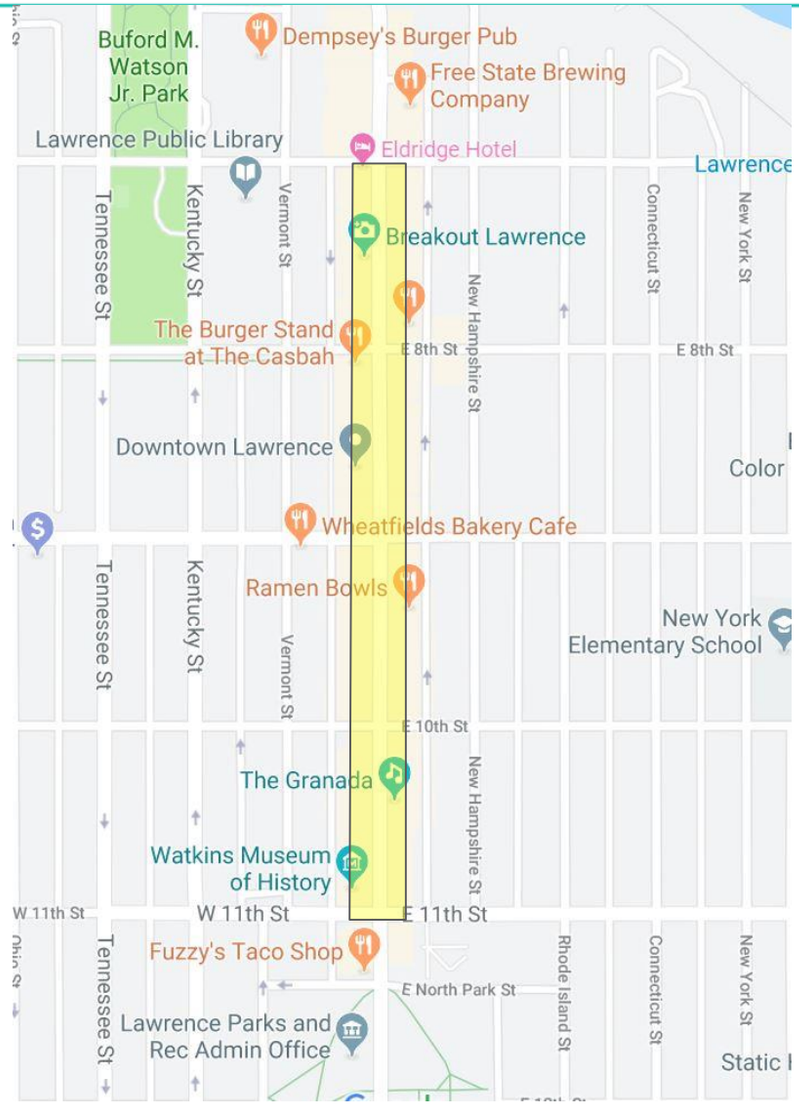
Better at handling uneven road surfaces and cracks in the road

Greater Tire Width

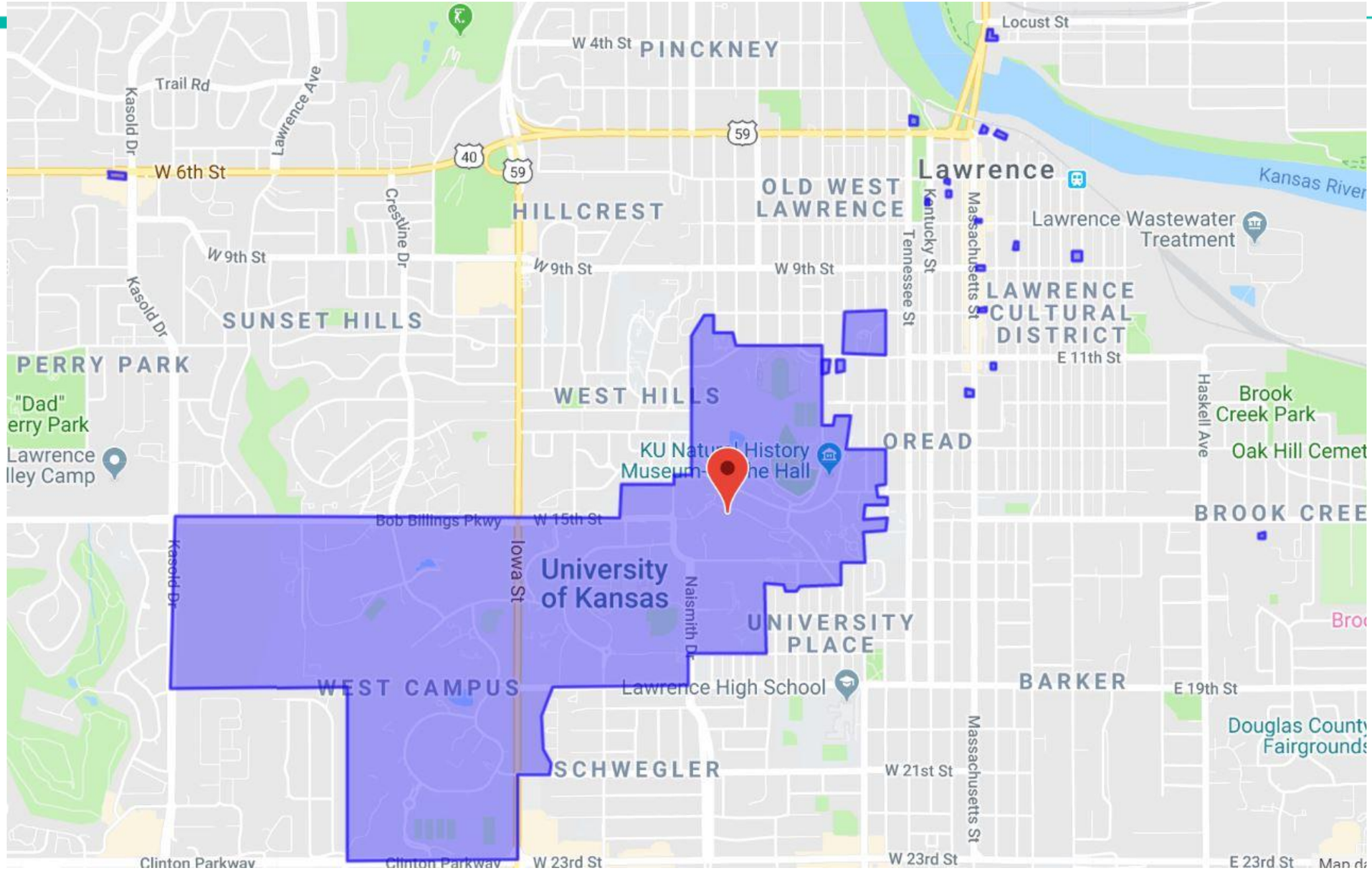
More traction means riders are less likely to slip or fall

Operations Plan

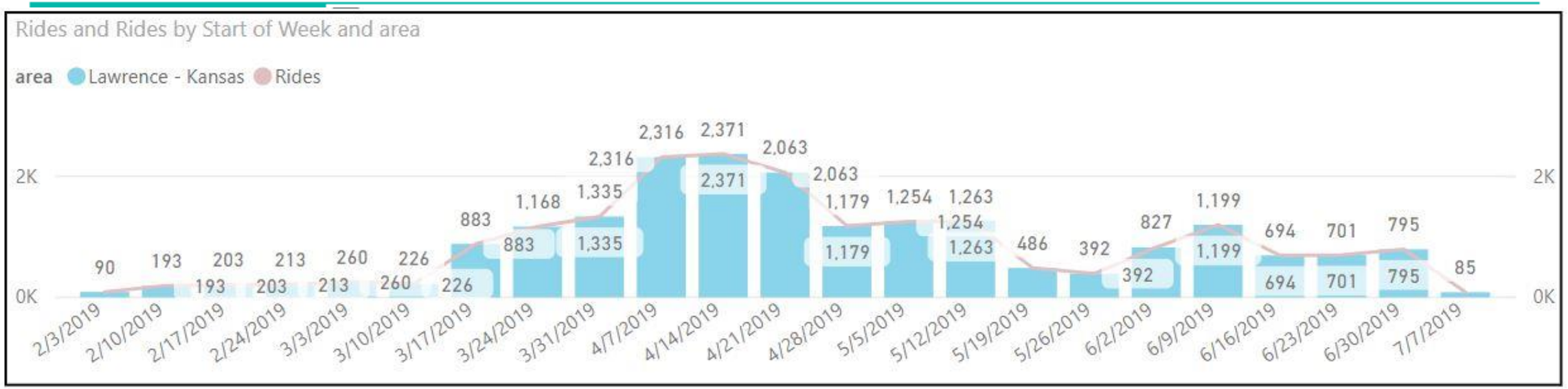
- 150 scooters on staggered launch
- -100 pedal bikes
- 150/150/150
- Pedal bike donation
- Reduced speed zones
- Data sharing
- Profit sharing

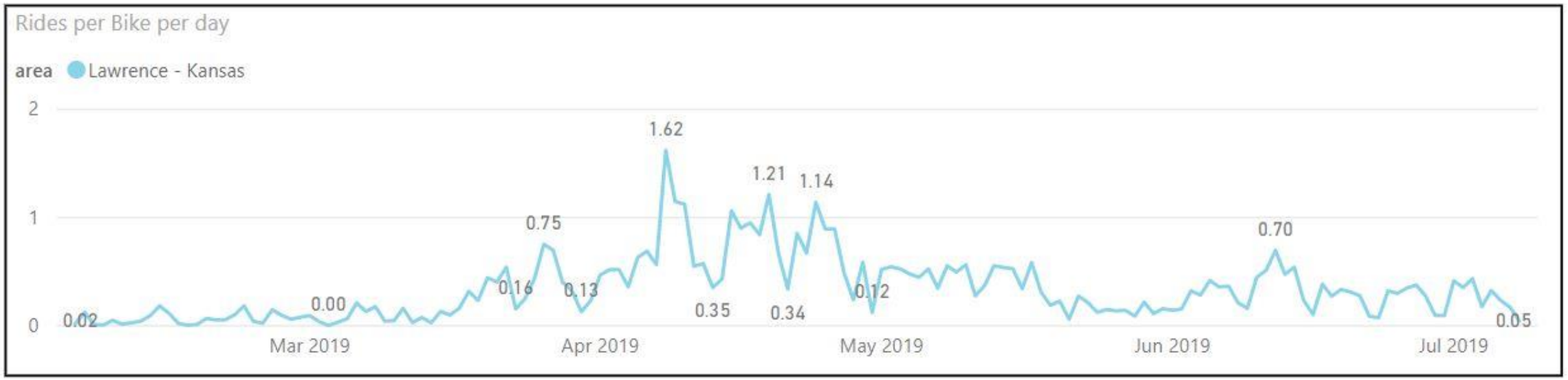


Forced Parking Areas



Forced Parking Areas





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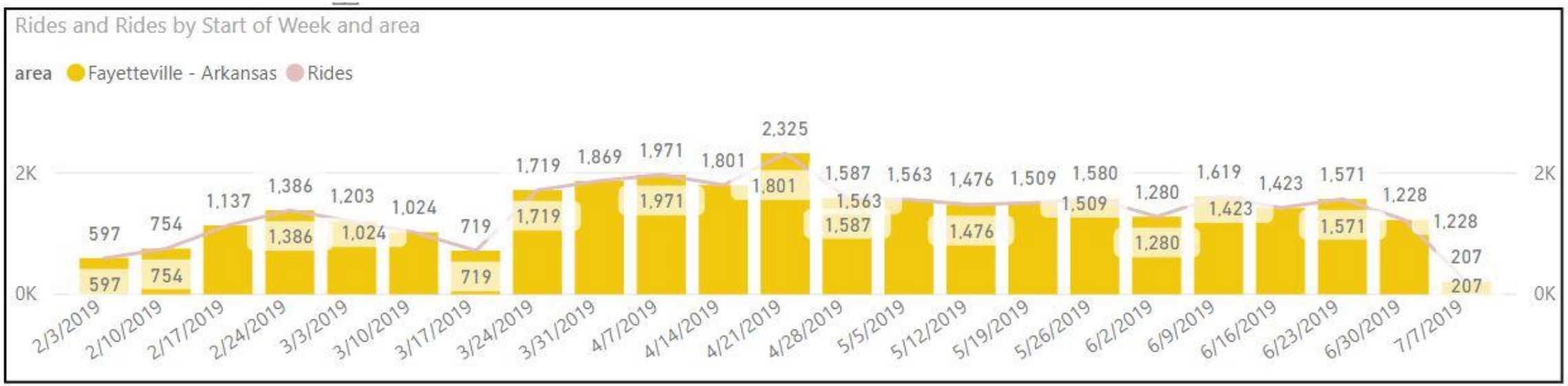
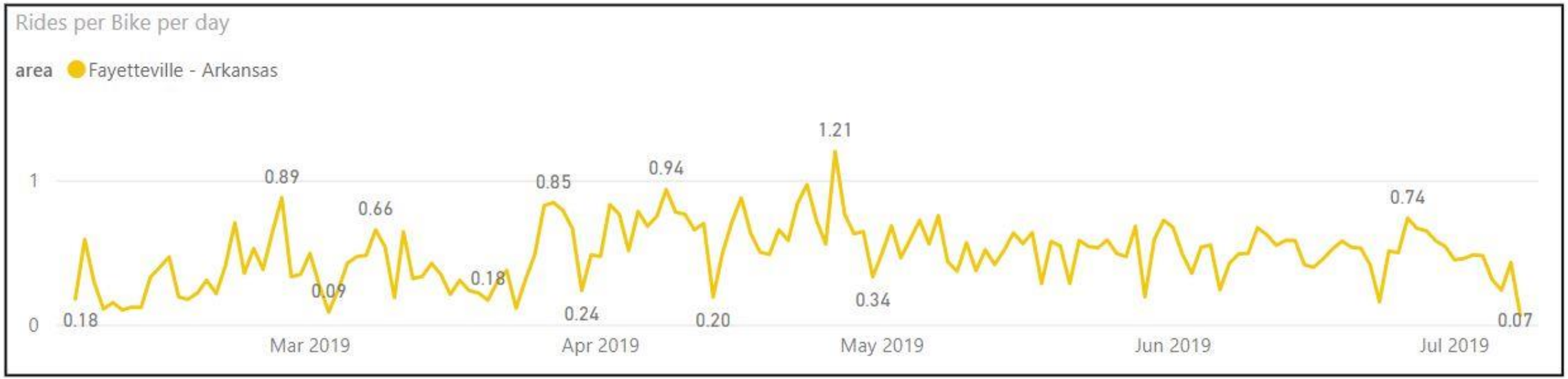
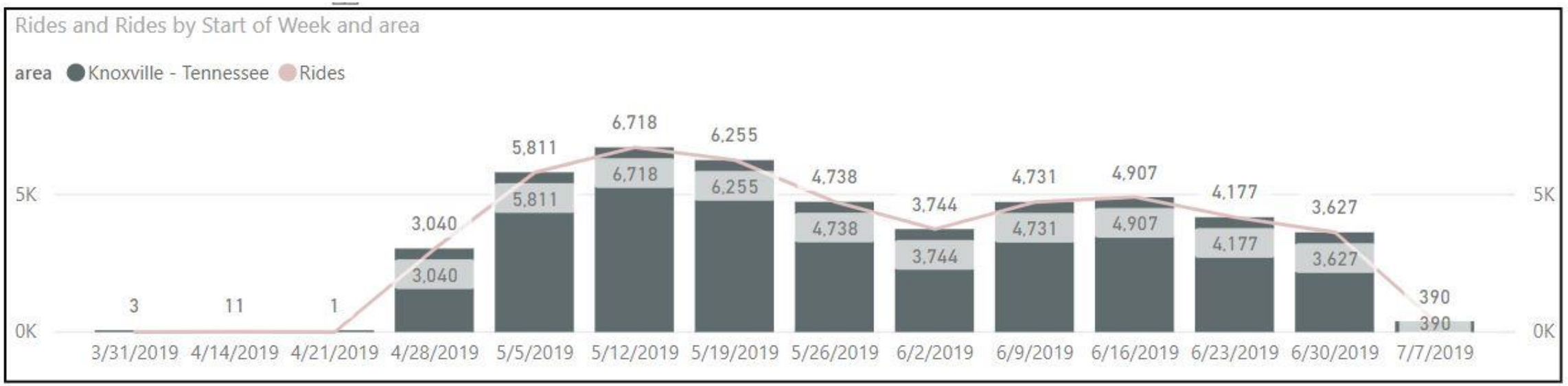
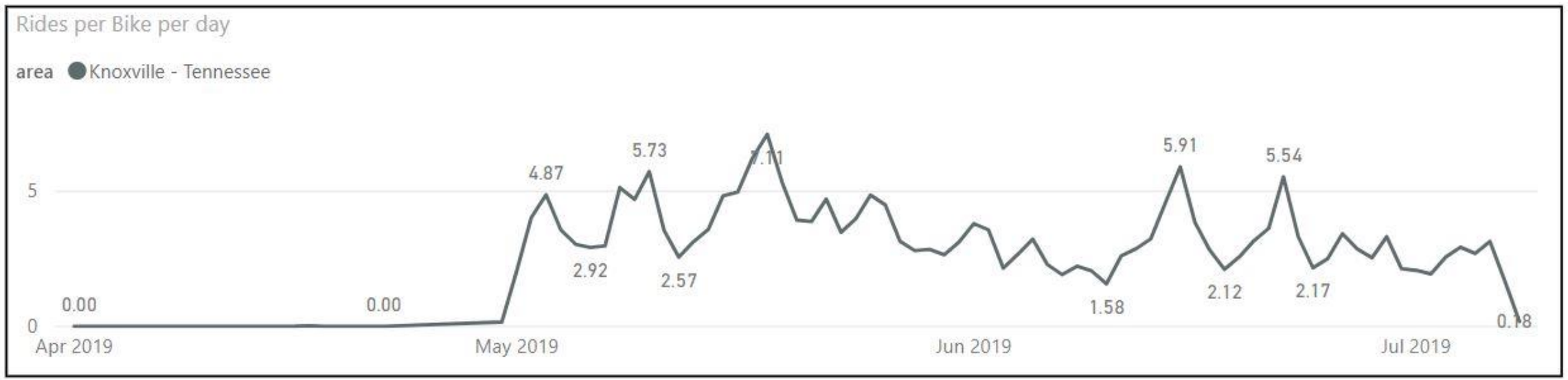




Scooters vs Bikes





Scooters and Forced Parking Removal

- Fewer cars
  - Less traffic
  - Lower emissions
- Increased revenue for more consistent operations
  - A larger team
  - Another fleet vehicle
- Data sharing
- Profit Sharing
- Increased public joy!

Bring Scooters to Lawrence

VeoRide

							Prohibited (X)							
	Device	**Kansas Standard Traffic Ordinance (STO) Definition (Article 1)**	**STO**	**City Code**	**Notes**	**Registration Required**	**Highway**	**Public Street**	**Bike Lane**	**Shared-use path**	**Sidewalk**	**Downtown Sidewalks**	**KU Sidewalks**	**Unpaved trail**
Electric Vehicles	Electric Assisted Bicycle	A bicycle with two or three wheels, a saddle, fully operative pedals for human propulsion, and an electric motor. The electric-assisted bicycle's electric motor must have a power output of no more than 1,000 watts, be incapable of propelling the device at a speed of more than 20 miles per hour on level ground and incapable of further increasing the speed of the device when human power alone is used to propel the device beyond 20 miles per hour.	Sec. 135	(STO)	Traffic regulations applicable to bicycles apply to e-bikes	No						X	X	
	Electric Personal Assistive Mobility Device	A self-balancing two nontandem wheeled device, designed to transport only one person, with an electric propulstion system that limits the maximum speed of the device to 15 miles per hour or less.		(STO)	Segway/Self Balancing Board	No								
	Electric Scooter	Self Propelled vehicle with at least two wheels, electric motor, handlebars, a brake and a deck designed to be stood upon while riding.	SB 63 (July 1, 2019)	(STO)	Traffic regulations applicable to bicycles apply to e-scooters	No	X							
	Low-Speed Vehicle	Any four-wheeled electric vehicle whose top speed is greater than 20 miles per hour but not greater than 25 miles per hour and is manufactured in compliance with the national highway and traffic safety administration standards for low-speed vehicles in 49 C.F.R. 571.500	Sec 114.3	(STO)		Yes	prohibited with posted speed limit > 40	prohibited with posted speed limit > 40 mph	X	X	X	X	X	X
	Golf cart	A motor vehicle that has not less than three wheels in contact with the ground, an unladen weight of not more than 1,800 pounds, is designed to be and is operated at not more than 25 miles per hour and is designed to carry not more than four persons including the driver.	Sec 114.4	(STO)		No	X	X	X	X	X	X	X	X
	Motorized Skateboard	A self-propelled device which has a motor or engine, a deck on which a person may ride and at least two wheels in contact with the ground.	Sec. 109.1	(STO)		No	X	X	X	?	?	X	X	X
	Motorized Wheelchair	Any self-propelled vehicle designed specifically for use by a physically disabled person and such vehicle is incapable of a speed in excess of 15 miles per hour.		(STO)	Treated as pedestrian	No	X	X	X					
Motorized Vehicles	All-Terrain Vehicle	Any motorized nonhighway vehicle 50 inches or less in width, having a dry weight of 1,500 pounds or less, and traveling on three or more nonhighway tires.	Sec. 114.1	STO & Ch. 17-216		No?	X	X	X	X	X	X	X	X
	Autocycle	A three-wheel motorcycle that has a steering wheel and seating that does not require the operator to straddle or site astride it.		STO & Ch. 17-216	(See motorcycle)	Yes			X	X	X			X
	Motorcycle	Every motor vehicle, including autocycles, having a seat of saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground, but excluding a tractor.	Sec. 137	STO & Ch. 17-216	Similar to motor vehicle	Yes			X	X	X			X
	Motorized Bicycle	Every device having two tandem wheels or three wheels which may be propelled by either human power or helper motor, or by both, and which has: (a) a motor which produces not more than 3.5 brake horsepower; (b) a cylinder capacity of not more than 130 cubic centimeters; (c) an automatic transmission; and (d) the capability of a maximum design speed of no more than 30 miles per hour.	Sec. 134	STO & Ch. 17-216	Same regulations applicable to motorized bicycles as bicycles	No?								X
Human Powered	Bicycle	Every device propelled by human power upon which any person may ride, having two or three wheels of which is more than 14 inches in diameter.	Sec. 128 & 131	Ch. 17 Article 7		No						X		
	Skateboard	N/A		Ch. 17 Article 7 & 8		No	X	X	X			X	X	
	Roller skates/ In-line Skates	N/A	Sec. 136	Ch. 17 Article 7 & 9		No	X	X	X			X	X	

NATIONAL LEAGUE OF CITIES

CENTER FOR CITY SOLUTIONS

Micromobility in Cities

A HISTORY AND POLICY OVERVIEW

NATIONAL LEAGUE OF CITIES

CENTER FOR CITY SOLUTIONS

About the National League of Cities

About the National League of Cities: The National League of Cities (NLC) is the nation's leading advocacy organization devoted to strengthening and promoting cities as centers of opportunity, leadership and governance. Through its membership and partnerships with state municipal leagues, NLC serves as a resource and advocate for more than 19,000 cities and towns and more than 218 million Americans. NLC's Center for City Solutions provides research and analysis on key topics and trends important to cities and creative solutions to improve the quality of life in communities.

About the Authors

Nicole DuPuis is manager of the Urban Innovation program, Jason Griess is the Heinz Urban Innovation Fellow and Connor Klein is a former research assistant in NLC's Center for City Solutions.

Acknowledgements

The authors would like to acknowledge Laura Cofsky who edited the report, and Paris Williams who designed the report.

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LANE
AHEAD

Foreword

Since the first Model T rolled onto the streets of Detroit in 1908, the automobile has reigned as the predominant mode of transportation in America. Cars quickly became a cornerstone of the American identity – and influenced the way America's cities, towns and villages took shape.

More than a century after the Model T's first trip, the smartphone has opened the door for a new wave of transportation options. Now, app-based mobility services present local leaders with an opportunity to reimagine the mobility environment.

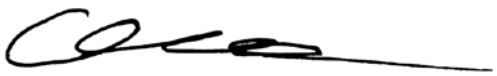
The past year, in particular, has been marked by a race toward micromobility, where bikes and electric scooters provide a new way for residents to move throughout their communities. While there is a great deal of promise with these innovations, the emergence of micromobility comes with its own set of challenges and considerations for planners, residents and local decisionmakers.

At the same time, many communities still have vast surface transportation needs which must be addressed for micromobility to take shape. As federal leaders debate how to fund America's transportation future, the National League of Cities (NLC) will continue to advocate for federal investments that support the wide variety of local projects that connect communities and grow their economies.

To provide local leaders with a comprehensive view of micomobility and the experience of different communities, NLC is proud to release Micromobility in Cities: A History and Policy Overview. The report provides officials with background information, case studies and recommendations to help them make the right decisions for their communities.

Together with our federal and state partners, local leaders will chart the next 100 years of transportation in America. This report will help them do just that.

Onward,



Clarence E. Anthony
CEO and Executive Director
National League of Cities

Introduction

Shared electric scooters have taken cities by storm, and by now, everyone has either seen or heard about this new way to get around. This old mode of transportation — the kick scooter — has been made new with an electric motor and the ability to be imminently shareable through app-based technology.

While scooters are the newest hot topic in micromobility, they are by no means the only form, with shared bicycle usage still the most common way to get around. This class of mobility option has truly taken off. First in docked form and now increasingly dockless, shared bicycles have truly taken off, reflected in growing usage rates in cities nationwide.

The emergence of micromobility, along with shifts in preferences for alternative modes of transportation, and wholesale monumental changes impacting transportation over the last few decades, have pressed us to ask several questions about how and why we design our cities. We need to consider the management of street and curb space, what a complete trip and street looks like, and who we are serving when we design our thoroughfares.

With this white paper, we hope to explore the rapidly changing and disruptive nature of micromobility, and provide city officials useful information to deploy micromobility options in a safe, profitable and equitable way. We begin by defining micromobility and exploring the recent history of docked and dockless bikes and e-scooters. We then explore the challenges and opportunities facing cities, and illustrate a few examples of cities that are addressing these issues head-on. We conclude with a set of recommendations cities can consider as they work to regulate these new mobility technologies.

Seven recommendations are explored in depth within the report including:

- Get out in front of surprise deployments.
- Utilize pilot programs to consider right of way policy, cost structure, sustainability and opportunities to work with different companies.
- Consider safety.
- Develop a plan and agreement for trip data.
- Reevaluate bike infrastructure.
- Focus on equity.
- Be proactive about learning from other cities.

Ultimately, these systems are an increasingly important part of city transit and mobility systems, as they help people move around cities more seamlessly and efficiently. The value is apparent and big questions, if they do arise, center around how these new systems — which are typically run by private operators — interact with existing laws and regulations. The regulatory system in many cities surrounding these new modes is not yet settled. The model of entering a city first and asking forgiveness later is alive and well, as companies seek to create new laws that allow them to operate unhindered. Many places have figured out the interplay between the operators and the regulators, but there are still quite a few cities working through these questions.

What is Micromobility?

The term “micromobility” has become a catch-all term for several modes of transportation, namely docked and dockless bikeshare systems, electric bikes and electric scooters. Many of these modes share some distinct features. The first commonality is the increased flexibility in routes and access spurred by the advent of connected devices. Many of these transportation services can be accessed and purchased with the use of a smartphone or other connected device. The second factor is scale, as these vehicles serve individual users.

Another key feature of some micromobility systems is a model of shared usage. For example, some bikeshare services use docking stations for drop-off and pickup, while others use smartphone apps to provide a dockless option. In both cases, each individual bike is used by many different riders, multiple times a day. There are several models for how these systems are managed. The fleet of vehicles might be owned and maintained privately, like the Chinese bikeshare provider Ofo, or owned and maintained publicly, like Capital Bikeshare in Washington, D.C. New York City’s CitiBike is a hybrid model in that it is publicly owned but privately maintained by the company Motivate.

These emerging micromobility services, in most cases, offer both flexible scheduling and flexible pickup and drop-off sites, which allow users to go exactly where they need to go when they need to go there. Some providers are even experimenting with on-demand vehicle delivery in less dense environments.[1] Even cities with expansive public transit systems have mobility deserts, in which portions of the population are underserved by transit or face barriers to access. Micromobility options offer cities another tool in fighting mobility deserts, by closing "first and last mile" gaps for transit systems, opening access to underserved populations and significantly broadening the pedestrian shed.[2] More generally, they also add more options to multi-modal mobility systems.

MICROMOBILITY VERSUS MICROTRANSIT?

The U.S. Department of Transportation (USDOT) defines microtransit as “a privately owned and operated shared transportation system that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling. The vehicles generally include vans and buses.” In addition to vans and buses, the past few years have seen the emergence of new modes that fit into this category, such as shared cars and low-speed autonomous shuttles. Occasionally, bikeshare systems are also classified as a form of microtransit.

What Does It Mean for Cities?

The emergence of micromobility options has inspired many cities to rethink the ways in which their transportation infrastructure might accommodate alternative modes. The expansion of bicycle infrastructure that accompanied the first wave of micromobility unlocked opportunities for the current wave of dockless bikes and scooters to thrive. In turn, their rapid deployment and uptake has put additional pressure on cities to accommodate new modes and consider safety of operation in mobility corridors that were largely developed to accommodate single-occupancy vehicles. This might have a compounding effect, as expanded bike infrastructure lowers the barriers for more bicyclists and commuters who choose other alternative modes of transportation.

This buildout of alternative infrastructure puts city planners in a delicate spot. While many are optimistic and excited about new directions, others are experiencing the very real tension between early-adopters and the large contingent of commuters in cars, who see this as a new, temporary trend that could further clog the already busy streets and rights of way in central business districts. City leaders and policy makers also face challenges associated with regulating these services, ensuring they are operating safely and equitably, and negotiating the terms of data ownership and use.

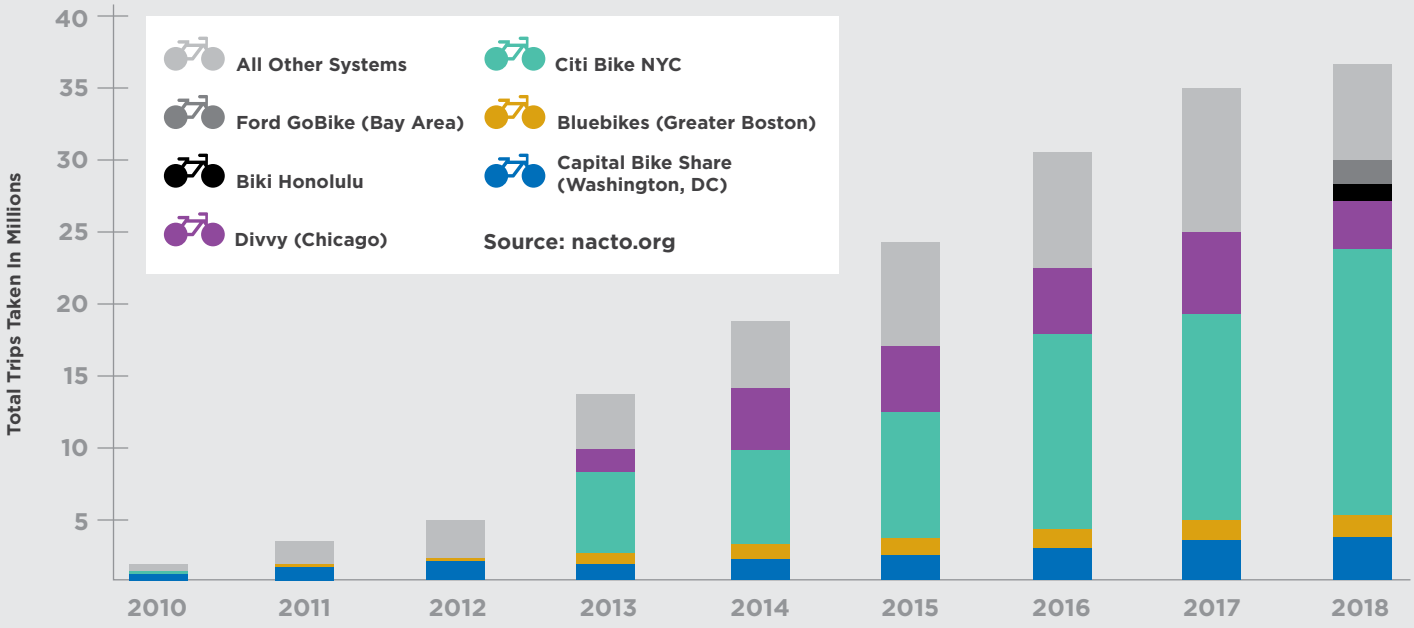
Different Types of Micromobility

Bikeshare

Informal systems of shared, communal bikes have been around for more than 50 years. In 1965, a group of anarchists in Amsterdam decided to procure more than 100 bikes, paint them all white, and leave them around the city for the public to use free of charge. After the bikes were stolen, vandalized and impounded, the group declared the project a total failure and stopped providing the service. Thirty years later, the city of Copenhagen tried a pay-to-ride system using a coin-based lock and unlock mechanism, but this too resulted in large amounts of destruction and theft. After recognizing customer tracking as the lynchpin to success, Portsmouth University in England instituted a bikeshare system using a personal magnetic stripe card to tie users to trips. This was an important step for bikeshare as it proved that a service could be created that was both convenient for users and less susceptible to vandalism.

Technological improvements like electronic locks, upgraded telecommunications systems and on-board computers served to improve these services. Rennes, France, and Munich, Germany, pioneered small-scale operations at the city-level in the late 90s, but adoption was minimal.[3] Lyon, France, scaled up the operation in 2005 and launched 1,500 bikes into the city in partnership with JCDecaux, calling it Velo'v. This effort generated adoption and success, and by late 2005, Velo'v reported having 15,000 members and an average of 6.5 rides per day on each bike.[4] Lyon's success piqued a genuine interest from

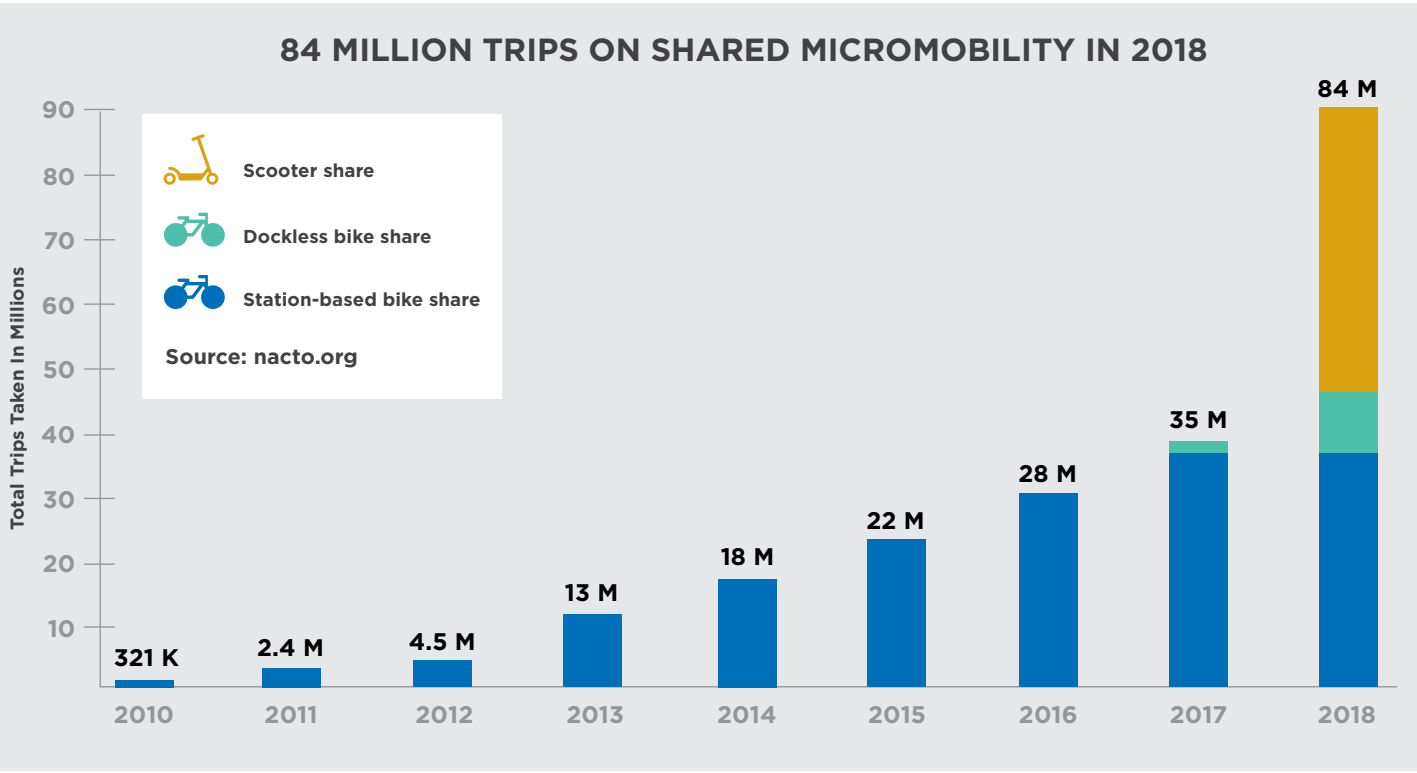
BIKESHARE RIDERSHIP IN THE U.S. SINCE 2010



Paris and thus created a watershed moment for bikeshare. In 2007, Paris launched Velib with about 7,000 bikes. In 2016, Velib reported over 18,000 bikes. Paris' experiment generated significant interest from other cities around the globe, resulting in about 60 similar programs by the end of 2007, including Barcelona's famous Bicing program, which rapidly spread throughout Spain.

Velib's early success ignited a movement that took bikeshare global. In 2008, Washington, D.C., created the first bikeshare pilot in the United States called SmartBike DC, launching 120 bikes at 10 location across the city. This small experiment quickly proved to be successful, and marks the beginning of the bikeshare phenomenon in the U.S. The following year, Montreal expanded on its own pilot program, partnering with a company called Bixi. Following successful deployment and adoption in Montreal, D.C. launched Capital Bikeshare in 2010 with Bixi's help. Other U.S. cities, like Minneapolis and Denver, quickly followed suit, also choosing to leverage Bixi's technology in their programs: Nice Ride and B-Cycle. Growth continued that year on the international market, with bikeshare programs launching in Australia, England, Mexico, Argentina and China.

New York City introduced CitiBike in 2013, which is a city-endorsed system that uses money from corporate sponsors in lieu of public dollars for vehicles and maintenance. The city of Chicago and the San Francisco bay area also deployed bikeshare programs that year. The total number of bikes increased to 700,000 worldwide in 2013, reached 1,000,000 in 2015 and 2,000,000 by 2016. Dockless bike pilots also began appearing in 2013, underwritten mainly by a company called Social Bicycles (now JUMP) in the U.S.



A massive "bike graveyard" in a field near Hangzhou, Zhejiang province, with tens of thousands of unused bikes. Photo Courtesy of: AFP / Getty

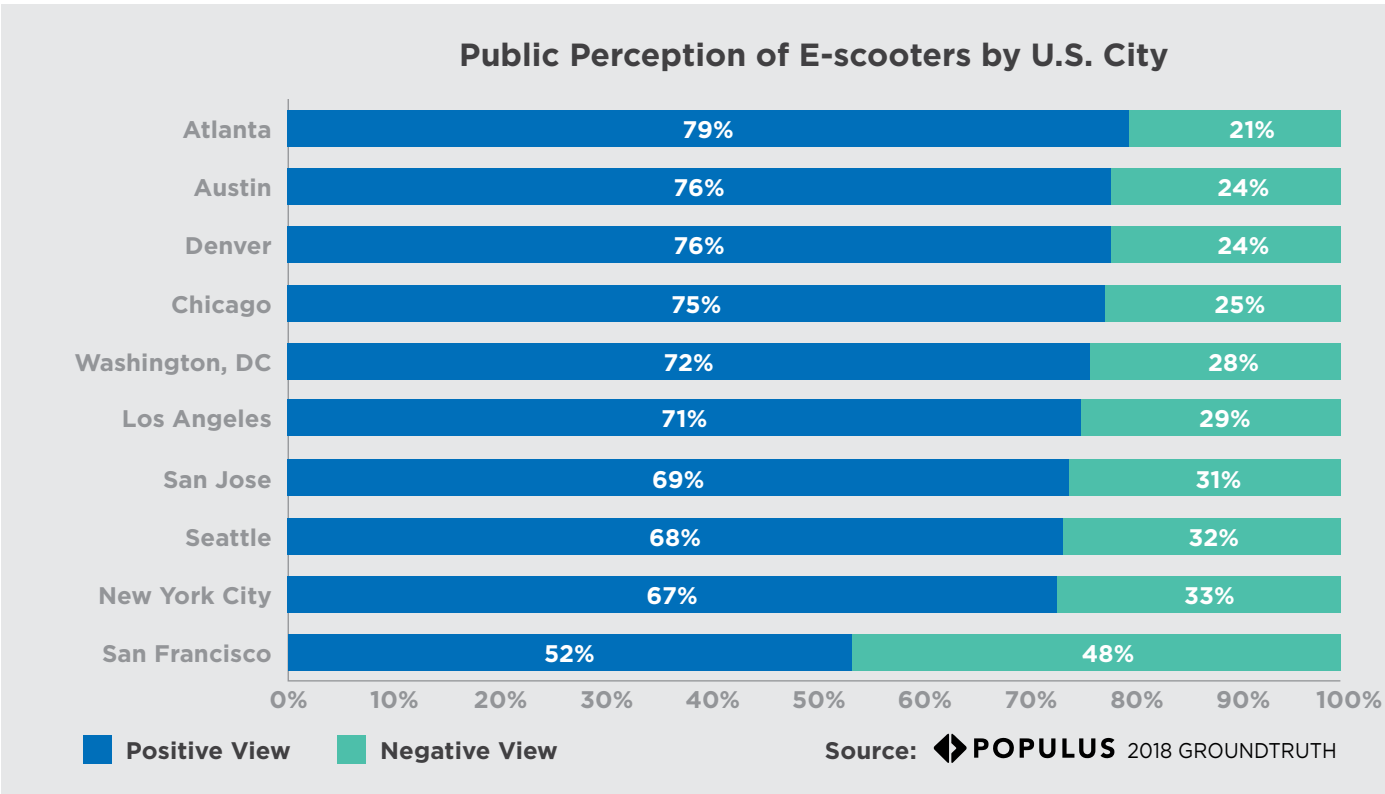
Through fits and starts, docked and dockless systems supported by city governments developed steadily all across the world and continue to do so, however, private micromobility companies are also a significant part of the market. 2014 marked the creation of the soon to be Chinese bikeshare giant Ofo, the first company to make use of GPS technology on a large scale to establish a truly dockless model. By 2017, Ofo had competition, as there were over seventy different bikeshare companies maintaining over 16 million bikes throughout China alone. Ofo attempted a move into other continents including North America. Shortly after they deployed in some U.S. cities, the company made the decision to cease all North American operations, and pulled out of those markets entirely. Since then, the dockless model has boomed in the U.S. due to other companies like Limebike (now Lime), which launched in June 2017. Less than 6 months after launch, the company surpassed 1 million trips across 30 markets.[5]

While 2018 was a turning point for micromobility as a whole, but not for bikeshare. While the number of bikeshare trips continued to climb, growth slowed from the previous two years, despite the expanded use of major bikeshare programs like Citi Bike NYC and Capital Bike Share in D.C.[6] At the highest level, private bikeshare providers are growing rapidly due to the combination of increased GPS reliability and the ubiquity of smartphones. In addition to shared systems using traditional bikes, some companies have added the availability of electric assist bikes. In the U.S., Lime and JUMP (previously Social Bicycles) are leading the way in electric assist bikes — and the market is growing. In 2016, the total known investment in dockless bikes alone was around $290 million. That increased to $2.6 billion in 2017, an almost tenfold increase in only a year.[7] Still, station-based models constitute a vast majority of bikeshare usage. According to NACTO, only four percent of trips in 2017 were taken on dockless bikes, even though nearly half of all bikeshare bikes are dockless. In 2018, dockless bikeshare constituted less than 20% of the total trips made by bikeshare.[8]

While the wave of adoption and investment could be seen as an overwhelming success, city leaders are forced to face the challenges of an ever-expanding and changing mobility market. Challenges include overcrowded rights of way and "bike graveyards" where large amounts of unused bikes are carelessly discarded in ways that obstruct safety or aesthetic. Nowhere is this problem more dramatic than in China. In a little over a year, 60 competing providers have deployed more than 15 million bicycles on Chinese streets with government support, but demand has not come close to matching supply.[9] Ofo alone, China's largest provider, claims to have over 250 million global users.[10] While the number of bikes from American providers pale in comparison, China's problem provides a crucial lesson about the necessity for smart regulation.

The dockless revolution has also created competition for more traditional city-run docked systems, as dockless options are usually significantly cheaper for consumers and offer additional flexibility without required drop off points. Not to mention that their implementation costs are a fraction of those for docked systems, which require additional infrastructure and maintenance for docking stations. In an interview with Quartz, an Ofo executive estimated the typical cost of a docked program to be "$80,000 to $100,00 to set up each dock, and $1,500 to $2000 per bike" — a stark contrast to the "couple hundred bucks" quoted for each dockless bike.[11]

While docked and dockless bikeshare systems have seen unprecedented growth, the emergence of another shared mode of transportation has dominated the discussion surrounding micromobility. In the last couple of years, electric scooters have demonstrated the public's sustained interest in new modes of transportation, all while sometimes surprising and rattling city decisionmakers.



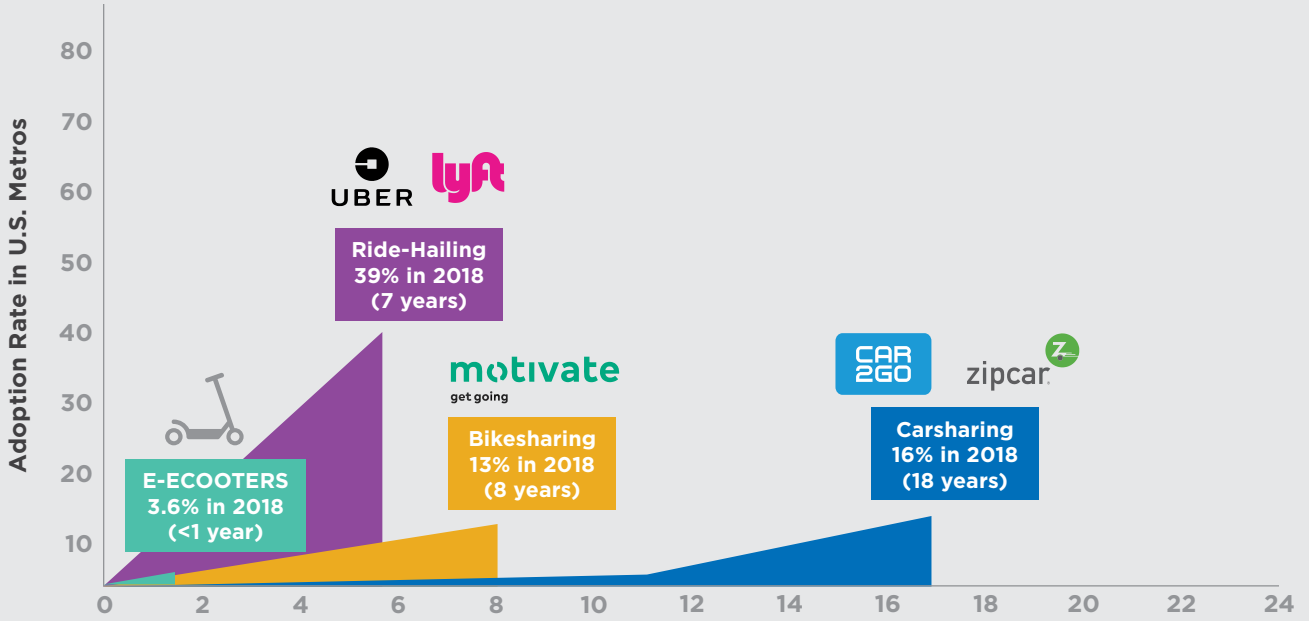
Scooters

2018 undoubtedly was the year of the electric scooter. Less than eighteen months old, scooters have already become the most popular form of micromobility, overtaking station-based bikeshare, and have been a huge boon to the entire industry. According to NACTO, the addition of scooters into the ecosystem boosted the total number of micromobility trips from 35 million in 2017 to 84 million in 2018.[12]

Using the same shared model as dockless bikeshare, e-scooters have quickly gained popularity as an alternative mode of travel for short- and medium-length trips. The scooters can reach speeds of around 15 miles per hour, depending on the company. The two companies dominating the e-scooter market, Bird and Lime, were both founded in 2017, and already they have surpassed over $1 billion each in valuation.[13] Bird, founded in Santa Monica, was the first company to deploy scooters in cities on a large scale. Starting in their home city, the company dropped hundreds of scooters onto city sidewalks overnight, reaching significant levels of use and interest. After seeing Bird's high use rates, other scooter companies like Lime, Skip and Spin followed suit with the "ask for forgiveness not permission" deployment strategy. Spin and Lime, among others, were already providing bikeshare services, so adding e-scooters to their application was an easy next step.

The rapid unexpected deployments were surprising to both local government actors and the public, and elicited a range of responses from the different parties. Each city handled the unexpected deployments differently, and while some opted toward crafting amenable regulations and pilot programs, others were less welcoming. New York City is one of a number of cities that chose to control deployment, limiting operation until a regulatory

A Comparison of Mobility Service Adoption Curves in the U.S.



Source: POPULUS GROUNDTRUTH
Clewlow & Mishra, 2017, Clewlow, 2016

framework could be established. Many cities impounded hundreds of scooters and others, like Milwaukee, took legal action against the companies. Even in pushing back against uncooperative business practices, cities recognize the potential for e-scooters to reduce congestion, transit inequity, carbon emissions and the cost of mobility for residents.

Furthermore, residents themselves seem to have a favorable view of e-scooters. In a recent report, Populus found that the majority of residents either enjoyed having scooters or were ambivalent towards them, with San Franciscans maintaining the lowest rates of acceptance (but still more than half, at 52 percent).[14]

Many criticisms from residents included the right of way crowding, dangerous drivers and blocked sidewalks from operating or discarded scooters. There were also anti-scooter vigilantes who broke scooters in half, placed them in trashcans, painted them and even tossed them into bodies of water.[15]

Many cities are considering ways to regulate scooters. Washington, D.C., ran a pilot project, which allowed six different companies to run 400 vehicles each. After the District's first scooter fatality occurred tragically in September,[16] the city passed regulations that not only require companies to go through an application process, but also set limits on the number of scooters allowed per provider and the speed at which scooters are allowed to travel.

Meanwhile, when Santa Monica began setting up their own pilot program, city officials ultimately did not recommend permitting Lime or Bird for the designated time period. This came as a surprise to the aforementioned companies as well as to the general public, eliciting protests at city hall as well as an extensive social media outcry from passionate riders.[17] The fate of e-scooters is not certain and will most likely vary from city to city. However, their impressive adoption rates and growing support in the short period of time they've been available may help them establish a lasting presence in the urban mobility landscape.

Mergers, Partnerships and Evolution

Interest in micromobility has increased, and transportation giants have begun focusing on these emerging markets. Recognizing the potential growth and transformation of urban transportation, both Uber and Lyft have sought to add dockless devices to their suites of services. Recently, Uber acquired JUMP, the electric-assist dockless bike company, and added their bikes to the Uber app. Following Lyft's example of deploying their own e-scooters, JUMP added e-scooters to their portfolio. Uber has already added JUMP's services to their app and began adding their logo to Lime scooters and bikes as well.

Investors are also showing interest in the individual bike and e-scooter companies. Lime received funding from the technology company Alphabet as well as a recent partnership with Segway. Bird also makes use of Segway's developed technology by renting scooters designed by the company.[18] Motivate, the bicycle operator for many bikeshare systems such as San Francisco's Ford GoBike and Washington D.C.'s Capital BikeShare, was acquired by Lyft, possibly in response to Uber's purchase of their competitor, JUMP.[19]

Motivate looked to be the largest in the nation for micromobility services before Chinese dockless bike providers like Ofo and Mobike spread the idea of dockless systems into the U.S. Another provider, Spin, that was founded in 2016 in San Francisco, has gained popularity and ridership through their bikeshare program that they initially launched in Seattle. Despite their success using bikeshare, they have decided to remove bikes in favor of offering only e-scooters.[20] Skip, formerly known as Waybots, intends to perfect the scooter industry by not only providing a better vehicle, but also asking cities for permission to deploy regardless of whether or not competitors are already operating. Their intent is to show riders that the quality of the vehicle matters to the quality of the service.[21]

Challenges and Opportunities for Cities

Safety

One of the main concerns surrounding the uptick in scooter and bike use is safety. Perhaps the most controversial, and greatest pain point for city leaders is scooter operation on sidewalks. Crashes between pedestrians and riders have resulted in injuries and stoked concerns in cities about liability. Some of the misuse of the dockless vehicles can be chalked up to users' unfamiliarity with the vehicles and the city's regulation of their operation. Every city has different rules about where bikes and dockless vehicles can be operated, and ultimately, it is up to the user to educate his or herself. The bike and scooter companies have also engaged in various efforts to educate the public about local regulations and the dangers of riding on sidewalks.

Another challenge inherent to micromobility usage is that many communities lack the infrastructure for alternative modes — their transportation networks are set up to accommodate cars. Once micromobility vehicles begin to occupy the street space, the car centric design of many cities might result in some dangerous or hazardous interactions. In fact, cities might find that cars present a danger to micromobility vehicles on the streets, similar to the threat that bikes and scooters pose to pedestrians on the sidewalk. This became tragically clear in September, when a 20-year old scooter rider in D.C. was struck and killed by an SUV.[22] Drivers are not used to sharing the road with other vehicles, and small, unprotected scooters and bikes traveling in the same areas as cars have resulted in crashes and fatalities. This is further complicated by the fact that the scooter companies do not have a good system for tracking accidents.

These challenges have inspired many cities to commit to designated infrastructure that can accommodate alternative modes. Some cities have begun to paint bike lanes in spaces previously dedicated to curbside parking spots or even create road barriers between bike lanes and vehicle lanes. These sorts of policies and actions create a more robust biking culture, by making biking and alternative mode use easier, safer and more efficient. As more residents choose alternative modes, drivers will become more accustomed to sharing road space, which has an agglomerating safety and environmental impact.

Another important safety challenge that providers and cities are struggling with is helmet usage. Many scooter-related injuries are directly tied to riders not wearing helmets. But shared systems give pedestrians the opportunity to hop on a bike or scooter whenever they please, which provides a lot of freedom but also leaves riders potentially unprepared and vulnerable. A traditional biker, using their own bike, is more likely to have their own helmet than riders on dockless devices, who use the vehicles on a whim, and might not want to carry bulky helmets around without knowing if and when they'll be on a bike or scooter.

Although bike and scooter providers implore users to wear helmets when riding, they do not advocate that cities mandate helmet usage. This challenge is particularly difficult to address because providers do not have an enforcement structure in place, and they have a vested interest in keeping riders' engagement with their vehicles nimble and spontaneous. This issue highlights the difficult circumstances scooters present local police and traffic enforcement officials. Enforcement is time

consuming, and violations are ubiquitous. Many cities are still struggling to find the right regulatory mechanisms to improve resident safety.

Curb Space Management

Many cities experience negative feedback from residents about dockless scooters and bikes being discarded carelessly in public spaces, such as sidewalks. Cities and providers require users to leave their vehicles in locations that do not block foot traffic or access points. This can be difficult to enforce, as there is no way to know who left a scooter in an illegal location, and many services lack a required verification method to make sure users are parking vehicles legally. And because these companies do not require stations, drop off and parking after use is subject to a rider's discretion.

One way to address this challenge is to require riders to take a picture of the vehicle after it is parked and send it to the provider. If a user continuously leaves their vehicle in inappropriate locations, then their account can be subject to suspension.

Another solution that many cities have implemented is to create designated parking zones for scooters or bikes. The parking zones are painted, designated rectangles in appropriate areas. Seattle has put many of these parking zones in place and has seen positive behavioral shifts in response.[23]

The parking spots function as an organizational tool for high volume areas where bikes or scooters are more likely to be left. These low-cost interventions provide guidance for riders, encouraging them to avoid blocking the right of way in crucial locations.

First and Last Mile

In any given urban environment, there are areas that are unserved or underserved by transit and mobility options. Fixed route transit options are limited in how many people they are able to serve. In addition, the distance the average American is willing to walk to reach a transit option, sometimes referred to as a pedestrian shed, is somewhere between one-quarter and one-half of a mile.[24] Micromobility options like bikes and scooters have the potential to increase that pedestrian shed distance and solve cities' first and last mile problems. For instance, many people that choose to commute via car may do so because their residence or destination is outside of a comfortable walking distance from public transportation. Dockless technology can function to increase the range of access around public transportation services, increasing ridership and potentially taking cars off of crowded city streets. While not everyone who can use micromobility options in their daily commute will elect to, the expansion of the micromobility industry could lead to large segments of commuters changing the way they choose to get around.

Micromobility is also poised to promote equity by improving services to low-income and underserved communities. Because micromobility services have minimal infrastructure requirements, they can be quickly deployed in low-service regions, helping residents get to where they live, work, play or pray. Additionally, there should be constant emphasis on balancing fleets, so that they serve all communities equitably. While the promise of transit equity has attracted many cities to these services, officials should acknowledge that the dockless nature of these services may lead to unequal distribution of scooters and bikes throughout their cities.

Pilot Programs

Many cities are opting for pilot programs before they commit to providers or to deploying micromobility on a large scale. In most circumstances, testing these vehicles on a smaller scale gives cities an opportunity to understand how they fit into the existing mobility ecosystem. Pilots also provide an opportunity to test the public's reaction to this new technology. While the private sector providers that deploy micromobility vehicles might be interested in launching as quickly as possible, city officials must always consider public safety, equity and the well-being of residents.

The public pushback in San Francisco caused by heavy scooter deployment exemplifies how rapid growth is not always beneficial to the public or, in this case, to the industry. After nearly 2,000 public complaints and 500 scooters were impounded, scooters were banned.[25] But there are success stories. The city of Santa Monica began the process of creating a pilot program for a select few providers. Initially, the committee tasked with recommending which providers should be selected left both Bird and Lime out of the program, due to the fact that the companies were initially unwilling to work with the city. After a series of public protests both at government buildings and over social media, Santa Monica decided to give permits to four companies, including both Bird and Lime. Pilots can be useful in cases like this to help cities regulate overzealous providers from deploying too much too soon, control the local mobility landscape and create a long-term plan using testing and gradual rollout.

City Examples:

San Francisco:

Keeping Providers at Bay

San Francisco has been a pioneer in micromobility, long before the term existed. The city introduced the Bay Area Bike Share pilot in 2013, and expanded the concept (now called "Ford GoBike") in 2017. This program started with 700 bikes based at 70 stations throughout the city. It has since grown significantly and established partnerships with East Bay cities and San Jose.[26]

After finalizing a permit application in June 2017, San Francisco was one of the first cities to create a comprehensive permitting process for dockless bikeshare providers. This allowed the city to regulate and monitor the deployment of the bikes while also allowing providers to quickly roll them out. In 2018, JUMP bikes became the sole permittee to operate a pilot program that included an initial 250 electric assist bikes as well as potential expansion of up to 250 additional bikes. The intention of the pilot was to see how well dockless bikeshare works in the city and to develop further policy recommendations based on its successes and failures.[27]

The introduction of dockless electric scooters into the Bay Area initially elicited some tension. When these companies deployed in early 2018, there was no permitting process or existing regulation in place for dockless e-scooters. Initially, Lime placed a limited number of pop-up scooter rentals throughout the city to test the waters for the scooter market. Their pop-up deployment initiated a rapid rollout by other competing, scooter companies. Lime, Bird and Spin deployed hundreds of scooters in a matter of weeks, and residents quickly began to take notice. Although the scooters

Scooter Share Pilot Program — SFMTA Application Assessments

Safety	Strategies to educate and train users should result in safe operations of scooters by riders.
	Strategies to promote and distribute helmets should result in helmet use by riders.
Disabled Access	Strategies to ensure properly parked scooters, including any commitments to locking or tethering, should result in parking that does not block the right of way.
	User penalties for poor compliance by users with laws governing scooter operation, including possibility of suspension by the applicant, should support appropriate operation.
Equitable Access	Approach to proving service to low-income residents, including diverse payment options and fare discounts, should reduce barriers to participation.
	Service area beyond the downtown core and commitment to rebalancing should ensure availability of scooters in underserved areas.
Community Outreach	Outreach approach should include strategies to ensure that low income residents are aware of service and how to participate.
	Approach to outreach should ensure that members of the public, including those that choose not to use scooter services, have the opportunity to be heard and to stay informed about the program.
Labor	Should demonstrate understanding of operational needs and resource requirements to ensure service reliability.
	Approach to hiring and training employees and/or contractors should ensure that staff have the knowledge and skills to ensure safe operational practices and knowledge of the communities in which they operate.
Sustainability	Approaches to operations and disposal should demonstrate commitment to environmental sustainability.
Experience & Qualifications	Applicant's experience in operating and maintaining shared mobility systems, in San Francisco and elsewhere as well as applicant's history, and the history of their users, in complying with city regulations should demonstrate their capacity to comply with the terms of the scooter share permit.

saw immense usage, some residents saw scooters as hazardous and irritating. Almost a month later, the city passed a law requiring companies to have a permit to park scooters on sidewalks and in public spaces. They also began working on a formal application process. On June 4, nearly three months and 2,000 public complaints later, the San Francisco Municipal Transportation Agency (SFMTA) banned scooters until a permitting process could be developed. After a dozen companies applied for permits, the city allowed two companies, Scoot and Skip, to each deploy 625 scooters, with a cap of 2,500 after the six-month halfway point.[28]

Applications were assessed with 12 criteria in mind, detailed below. According to the chart, both Skip and Scoot came up with innovative and satisfactory ways to promote safety, increase access and conduct community outreach.[29] The city also shielded taxpayers from implementation costs, charging each company a $5,000 application fee, a $25,000 annual permit fee, and a $10,000 endowment per company to cover costs.

San Francisco's approach has been replicated in cities like D.C., and may set the tone for other cities. The three major steps in the process — a legislative restriction on what is allowed in public

Rating Definitions

SFMTA

Strong ratings were given to responses that included detailed, unique or innovative approaches demonstrating the highest level of commitment and ability to solving known challenges and concerns, and substantially exceeding the minimum requirements. The SFMTA evaluated these proposed approaches as highly likely to achieve the stated standard.

Fair ratings were given to responses that included basic or typical, but unexceptional solutions, demonstrating a moderate level of commitment and ability to solving known challenges and concerns and meeting or somewhat exceeding the minimum requirements. The SFMTA evaluated these proposed approaches as moderately likely to achieve the stated standard.

Poor ratings were given to responses that at best met the bare minimum requirements established in the terms and conditions for holding a permit, and often lacked important details, demonstrating a low level of commitment and ability to solving known challenges and concerns. The SFMTA evaluated these proposed approaches as unlikely to achieve the stated standard.

Bird	HOPR	JUMP	Lime	Lyft	Ofo	Razor	Ridecell	Scoot	Skip	Spin	Uscooter
Fair	Fair	Poor	Poor	Poor	Poor	Poor	Fair	Strong	Fair	Fair	Fair
Poor	Strong	Poor	Poor	Poor	Poor	Poor	Poor	Strong	Fair	Poor	Poor
Fair	Strong	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Strong	Strong	Fair
Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Fair	Strong	Poor	Poor
Poor	Poor	Strong	Poor	Strong	Fair	Poor	Poor	Poor	Strong	Fair	Poor
Poor	Fair	Strong	Poor	Poor	Fair	Poor	Strong	Fair	Strong	Poor	Fair
Poor	Poor	Strong	Fair	Fair	Poor	Poor	Poor	Strong	Fair	Strong	Poor
Poor	Poor	Poor	Fair	Fair	Poor	Poor	Poor	Fair	Strong	Poor	Poor
Poor	Poor	Strong	Strong	Strong	Strong	Poor	Strong	Strong	Strong	Strong	Fair
Poor	Poor	Poor	Fair	Fair	Strong	Poor	Poor	Strong	Fair	Poor	Fair
Poor	Poor	Fair	Fair	Strong	Poor	Fair	Fair	Fair	Poor	Fair	Poor
Poor	Fair	Fair	Poor	Poor	Strong	Poor	Poor	Strong	Strong	Poor	Poor

spaces, a permitting and piloting process, and a cost recovery mechanism on the back-end — show how cities can leverage control over public assets to influence companies' behavior while staying nimble and innovative.

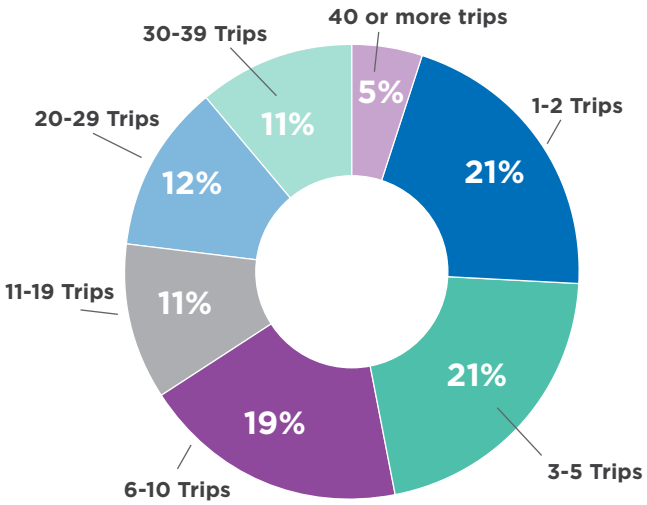
Washington DC:
The Beginning of Shared Micromobility in the US

Washington, D.C., has not only embraced new transportation technology but has also managed to facilitate smooth adoption of new modes. The growing interest around micromobility and the city's openness to innovation make it an optimal place for testing and development of alternative transportation services. The Washington, D.C., metro region has the unique honor of being the first in the U.S. to launch a bikeshare program. In 2008, the city started SmartBike DC which included 120 bikes at 10 different stations in the downtown area. It operated for two years. Surrounding areas, including Arlington, Virginia; Alexandria, Virginia; and Montgomery County, Maryland, worked with the District to create a collaborative bikeshare program that serviced a much larger region. Arlington and D.C. launched the program in 2010, and by 2018 the program had expanded to six jurisdictions under the name Capital BikeShare.[30] Washington, D.C.'s, program has helped many other cities structure, implement and maintain their own city-led, docked bikesharing projects.

The dockless trend began in D.C. in September 2017, first with bike providers Mobike, Spin, Ofo and Lime, which operated under a permitting system allowing them to each operate 400 vehicles.[31] Communicating with the District's local government prior to deployment helped provide the necessary control for the city and access to markets for the deployers. The original three providers were eventually joined by more bike companies as well as scooter providers. LimeBike rebranded as Lime and began to offer scooters in addition to their bright green bikes. Spin did the same and has now taken bikes off the streets in favor of scooters because of the incredible growth they have seen in the scooter market. When dockless services began to emerge in the city, D.C. established a pilot program to test them. While original plans had the pilot program ending in April, it was extended until August 31, 2018.[32] A second extension began September 1 and went through the end of 2018.

In November, the District released a permit application (see Appendix) for dockless companies to operate in the city, using the pilot program to inform new rules for scooter providers, including a cap on fleet sizes (600 scooters per provider), and a speed limit of 10 mph. These rules took effect on January 1, 2019. Scooter providers

How Many Trips Do Capital Bikeshare Riders Take?



Capital Bikeshare is serving many types of users, from occasional riders to superusers. Graph adapted from Virginia Tech (2018). D.C. Dockless Bikeshare: A First Look. Accessed at https://ralphbu.files.wordpress.com/2018/05/dc-dockless-bikeshare_a-first-look_may_10_2018_publication.pdf

like Bird, Lime and Skip have submitted complaints to the District's DOT, claiming the 600 scooter cap is too restrictive. Bird has also called the speed limits a "troubling development," despite the fact that the 10 mph speed limit has been the law since 2006[33] and has only been enforced since January 2019.[34]

New York City:
The Largest Operating Bikeshare System in the U.S.

As the largest city in the U.S., New York City represents a huge opportunity for micromobility providers. NYC adopted a bikeshare system in May 2013, partnering with Citibank to sponsor the CitiBike system. Residents immediately took advantage of the initial 6,000 bike release, racking up over 20 million miles in 18 months. By the end of 2017, the expanded fleet of nearly 12,000 bikes racked up over 1.8 million miles (over 60,000 per day). Each bike was used approximately seven times per day by more than 146,000 users. Mayor Bill de Blasio highlighted the success of CitiBike, saying, "Bikeshare is now an essential part of our transportation system and another way we're making sure New Yorkers have many ways to get around town."[35]

This summer, NYC launched a dockless pilot to supplement CitiBike and explore new modes. JUMP, Lime and CitiBike were granted permission to operate in three areas across the city, and CitiBike began offering a dockless product. Electric scooters have not entered New York City yet, and a spokesperson for the DOT has asserted that: "While [they] are aware of the industry and the larger companies within, these devices are not currently legal to operate in NYC under state law."[36] In November, city councilmembers introduced a bill to legalize e-scooters and establish a pilot program.[37] Most recently, Lyft announced an additional $100 million investment in CitiBike after acquiring Motivate, the nation's largest bikeshare provider, promising to double its current service area and deploy up to 40,000 bikes by 2023.[38]

Kansas City:
Intentional, Incremental and Equitable

Kansas City, Missouri, is working proactively to engage emerging technologies and the often-disruptive business models used to monetize them. One of the keys to Kansas City's approach was proactively communicating with dockless scooter providers. As soon as they found out Bird would be deploying 100 scooters in the city, officials set up a call and insisted on collaboration. The resulting Interim Operating Agreement (IOA) was a win for both parties. The negotiation allowed the city and Bird to find common ground, letting Bird launch legally while the city developed its Shared Active Transportation Pilot Program. Cooperation created an opportunity for Bird to deploy five times the number of scooters they originally planned, while Kansas City secured data-sharing agreements and began planning for cost recovery. The IOA provided a mechanism for Bird to incrementally scale their fleet as specific performance measures were achieved.

Following Bird's deployment, Lime began exploring their own deployment. Officials were able to collaborate with Lime much earlier in the process, which proved valuable for both parties. First, Lime was able to provide a more expansive educational package that included in-app notifications to riders about how to ride, where the scooters were going to be placed and general tips. They also agreed to develop a sophisticated data dashboard with information on all their scooters. The depth of this data equips planners and policymakers with the tools they need to evaluate how well both Bird and Lime scooters are serving the people of

Kansas City. On December 5, 2018, the city began accepting proposals to participate in a pilot program for electric scooters, e-bikes and other forms of shared active transportation.[39] The pilot program is expected to start in early April 2019.

Kansas City's intentionality bought them the time they needed to address the complexities that accompany this new mode of transportation. The Interim Operating Agreements (IOAs) with Bird and Lime expire six months after signing, giving city staff the opportunity to plan and negotiate further with scooter providers before addressing potential full deployment. The companies are required to respond to the Shared Active Transportation Pilot Program in order to continue operations. The city is using this pilot program to give residents and policy makers the time to address crucial questions about how scooter providers will work with the city and be distributed, and how the city might adjust rules of the road to accommodate them. There were several regulatory due diligence challenges that city officials had to deal with, including the crucial balance between education and enforcement. The first major hurdle was establishing whether scooters were legally able to occupy street space, and whether it would be legal for users to ride on sidewalks, public streets and bike lanes. City officials found it easier to apply motor vehicle laws to scooters (including a ban on sidewalk usage), but the city has made it clear that they are reserving the right to enforce that rule for particularly egregious cases.

The city's incremental approach to regulating scooters has several advantages. First, it allows the city to work with Bird and Lime to build relationships with business and neighborhood associations to share information on responsible ridership, parking, and improperly deployed or parked scooters. Second, residents have the time to voice concerns about the disruption scooters might present to their commute. Finally, the city can now analyze ridership data to answer an incredibly important question: Are these scooters benefitting everyone in the city?

The promise of affordable, dockless transportation options is not lost on Kansas City. In fact, the scooters' ability to provide first and last mile transportation to Kansas City residents most in need is one of the main criteria under evaluation. Anecdotally, people are seeing "a wide variety of demographics riding these scooters that you would not see riding bicycles," said city planner Joe Blankenship.

Despite their affordability, the dockless nature of scooters implies a variability in terms of where the hardware ends up.[40] Simply put, there's no guarantee that scooters will be waiting for passengers at their bus stops. The pilot program equips the city with the data they need to answer these access and balancing questions.

Kansas City's approach has allowed them to address the infrastructure costs up front. Since the scooters are occupying bike lanes and ridership numbers are much higher than expected, the city is now forced to drastically rethink how and when to adjust their bike infrastructure. Thankfully, the ridership data provided by the companies is assisting in prioritizing bike infrastructure projects.

Norfolk:
The Cautious Approach

Unlike several of the previous examples, Norfolk did not accept scooter companies' surprise deployments. Bird's rapid roll out was cut short when the city immediately impounded the 66 scooters that showed up overnight. A few weeks later, the city impounded another 500 scooters. To date, those scooters are still sitting in the impound lot, and now come with $90,000+ fee.

Despite this incident, Norfolk is not antagonistic towards launching alternative modes of transportation. Earlier in 2018, the city launched a pilot with 200 Pace bikes — a program that saw over 10,000 rides in its first seven weeks.[41] The city's relationship with Pace, however, has been collaborative and communicative from the start, allowing the city to prepare residents, work towards expanding bike infrastructure and monitor the pilot's progress.

Norfolk is still quite open to the idea of scooters on their streets, and they are currently working towards a more comprehensive and formalized approach to adoption. The city released a request for proposals in January 2019, looking for service providers for a one-year pilot program. This pilot is exclusively geared toward solving the first/last mile gap, increasing access for citizens overall and providing visitors with on-demand transportation.[42]

Los Angeles:
Leveraging Systems for the Public Good

With infamous levels of congestion and an impressive service area, the city of Los Angeles has many incentives to explore alternative modes of transportation for its four million residents. In the summer of 2016, the city launched a bike share pilot through the metro system with approximately 1,000 bikes. Despite their attempts to get ahead of the curve, the wave of micromobility deployments created a lot of pressure for the city to adjust — and quickly. Through their collaborations with other cities, an emphasis on a comprehensive and sustainable plan for data and an open process with their residents, LA created tools to leverage micromobility providers to the residents' benefit — a model other cities are incorporating into their own efforts.

When scooters burst onto the scene early last year, LA was in the process of creating guidelines for dockless bikes. The guidelines for dockless bikes were quickly expanded to include scooters nearly overnight. The city coordinated visits to Seattle to learn from their experience and inspire policy recommendations incorporating data. In September, the city released the first set of rules for dockless vehicles, including applications for a 120-day conditional use permit. After accepting seven applicants, the city allowed the deployment of 21,000 dockless vehicles. The first round of deployments allowed the city to explore the effects dockless vehicles would have on their transportation landscape while buying it the necessary time to develop full, one-year permits.

The city developed the Mobility Data Specification (MDS) as, "a way to implement real-time data sharing, measurement and regulation for 'mobility as a service' providers."[41] The MDS is comprised of two APIs, one for the service provider and one for the agency. Imposing data standards for all dockless vehicles will greatly expand the city's capacity to learn about how these devices are being used. Furthermore, the city released the MDS on GitHub, making it a completely open source product for other cities to use. This is a significant example of public sector innovation.

Los Angeles' approach is characterized by openness and collaboration. The MDS and the city's guidelines have been open to public input from the very beginning, and a result, the city is well-positioned to respond to new services as they sprout up. But crucially, LA is also establishing itself as a leader in the micromobility space.

Recommendations

There are a number of considerations for city decisionmakers to keep in mind as they explore the new and changing regulatory environment surrounding micromobility:

Get out in front of surprise deployments.

A major trend in micromobility is that companies are quicker to ask for forgiveness than permission when it comes to deployment. Companies have rapidly deployed in many markets without any notice to city governments, putting officials on their heels. In San Francisco and Norfolk, this led to temporary bans on operation. This sort of relationship is untenable. Micromobility providers should be communicating with city officials and stakeholders. But for city officials, the risk is in not being proactive. Cities that remain unprepared are essentially relinquishing control of public assets to private companies, while simultaneously taking on the implementation costs of incorporating a new mode. Furthermore, local governments will be held accountable by residents if there are any mishaps or friction. City officials can head this off by communicating with micromobility companies from the beginning, and proactively considering any regulatory processes that might take place.

Utilize pilot programs to consider right of way policy, cost structure, sustainability and opportunities to work with different companies.

A pilot program is a great tool for walking the line between public safety and innovation. Pilots allow cities to experiment with many aspects of these services before moving on to full deployment or committing to working with certain companies. There are several aspects cities should consider during the pilot:

- **Right of Way Policy:**
  Cities like Norfolk and San Francisco used their right of way policy to substantiate their temporary bans/impoundments in the law. Exploring or amending your right of way policy or related fees can help set formal boundaries with companies and for law enforcement, and allow city DOTs time to incorporate curb space management into full deployment.
- **Cost Recovery Mechanisms:**
  Kansas City and D.C. are taking two very different approaches to cost recovery. On the one hand, Kansas City is using the revenue from scooters to fund a separate account dedicated to expanding alternative transportation infrastructure. On the other hand, D.C. is requiring a $10,000 bond to cover the costs of removing broken or improperly parked scooters. Developing a clear plan for what your city will charge micromobility providers and how revenues will be distributed should be a key part of any pilot.
- **Sustainability:**
  Micromobility promises smaller, more affordable and more environmentally sustainable modes of transportation. While many companies have declared success on this front, cities can use a pilot program to understand who is riding, how many bike/scooter trips are replacing car trips and other indicators that might be important to a city's sustainability goals.
- **Working with Different Providers:**
  While a few companies have shot out of the gate in the micromobility space, there are a multitude of providers, and they all have slightly different approaches and business models. A pilot program is an opportunity to explore every option, and determine which of the many micromobility companies might be the best partner to meet your community's specific mobility needs. Though many of these companies provide similar services, the way they cooperate and interact with cities can vary dramatically.

Consider safety.

One of the major lessons gleaned from the short history of micromobility is that companies will encourage but not enforce safety standards. That responsibility falls squarely on the city's shoulders. Understanding how to keep residents safe while allowing them to utilize these new services is one of the biggest challenges cities will face. Of course, safety means more than requiring riders to use helmets or imposing speed limits; it means reevaluating the city's entire transportation ecosystem. Examinations of how riders interact with sidewalks, bike lanes, roads, cars, pedestrians, potholes and other parts of public infrastructure all factor directly into safety concerns.

Develop a plan and agreement for trip data.

Dockless bikes and scooters are unique in that they were popularized during an era of connected devices. This means providers have an unprecedented amount of quality data on vehicle locations and trips, which can be critical to city governance decisions. Not only can this data help bolster safety and accountability efforts, but it can also help cities see who is using these services, where they're going and when, and how well their current transportation infrastructure maps to that information. Los Angeles recognized this early and developed its open source Mobility Data Specification for any city to use. Carefully planning and executing data-sharing agreements with these companies may be one of the most important ways to hold them accountable and use these technologies to move toward your city's transportation goals.

Reevaluate bike infrastructure.

Micromobility also promises benefits for residents who already use bicycles as a primary mode of transportation. As Kansas City demonstrates, there is demand for expanded bicycle and alternative transportation infrastructure. While many stakeholders in the biking community see this as a positive shift toward more bicycle-friendly communities, there are other stakeholder groups that are not as enthusiastic about dedicating more space to other modes. Along with potential for increased safety and widespread adoption of smaller, more affordable and more sustainable modes, micromobility produces a real tension with urban commuters in cars. This should be a key consideration in deployment strategies. Making the case for, and taking the steps toward, a balanced expansion of bike infrastructure, will be a nuanced and difficult path.

Focus on equity.

Providing equitable transportation options is one of micromobility's greatest potential offering. Some cities, such as Columbus, Ohio, and Washington, D.C., are requiring companies to deploy in underserved areas so as to ensure these new pilots and programs align with their goals around equity.[43] Many cities are also working with companies to provide solutions and access for unbanked users. While there are several ways to consider equity and ensure it aligns with your city's goals, equity should be central to deployment negotiations.

Reach out and connect with other cities.

Many of the cities in this report are taking innovative approaches to the growing wave of micromobility services, using some or all of the strategies outlined above. City staff around the country have engaged in creative responses to service providers' surprise deployments, which put them in a position to succeed in 2019. Their work also allows them to share knowledge with other cities. When staff from Los Angeles visited Seattle to learn from their experiences with micromobility, they came away determined to make data open and usable. Their efforts created the Mobility Data Specification, which is now available to all cities. This experience could be replicated to address issues around equity, cost structure and vehicle caps and to generate best practices and standards across the country. Setting these standards could set the tone for how service providers interact with cities in the future.

Appendix

Washington's DC's Permit Application Requirements

	 BICYCLES	 SCOOTERS
Fleet	• Up to 600 vehicles, to be reevaluated quarterly • Must be equipped with a lock • Cannot travel more than 20 mph	• Up to 600 vehicles to be reevaluated quarterly • Cannot travel more than 10 mph • Must provide users with a free helmet within 14 days of request
Performance-Based Fleet Expansion (up to 25% per quarter)	• Number of monthly trips, daily trips per vehicle, trips originating or terminating in Equity Emphasis Area, • Number of Parking/Safety violations, • Vehicle Idle time • Installation of bicycle parking infrastructure, • Incentivizing users to park at corrals or DDOT-specified locations	
Parking	• Must maintain a pedestrian travel space of at least 5 feet • Unimpeded access to private property, CaBi stations, bus stops • Outside of protected tree planting locations • If parked incorrectly, provider must move vehicle within 2 hours of notification	
Vehicle Distribution	• Must deploy at least 6 bikes in each ward by 6 am • Shall not impose additional fees on any rider	
Fee	• $10,000 refundable bond to pay for failure to meet any above requirements • $50 application fee • $25 technology fee • $250 initial permit fee • $100 annual renewal fee • $5-$60 fee depending on month of deployment	
Data and Reporting	• Provide publicly accessible API with real time location data • Must comply with Generalized Bikeshare Feed v1.0 • Private API for DDOT • Monthly Report with user, vehicle, and trip data, safety and parking reports	

Source: DC DDOT Permit Application Process

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A comprehensive guide to electric scooter regulation practices

by

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A REPORT

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Abstract

Electric scooters ("scooters") are an exciting new member of the urban trend of micro-mobility, having appeared in cities as recently as 2018. Micro-mobility is an urban transportation solution that covers 5 miles or less; micro-mobility options previously included dockless bicycles, pedestrian-only areas, and autonomous vehicles (self-driving cars that do not require a human driver) until scooters burst on the scene in 2018. Micro-mobility options are meant to provide a convenient and cheap last mile option. Scooters provide just that. Scooters have been deployed by companies - more often than not - without any communication between cities on their implementation. By not communicating a plan for regulation with cities, many scooter programs failed or were rolled back due to temporary bans. While scooters may be a viable part of the micro-mobility solution, they conversely present as many issues as they do solutions. The issues that scooters unintentionally brought with them to cities included safety, liability, operational questions, and infrastructure questions. A lack of data and scholarly research on scooters compounded these issues.

The purpose of this research is to help cities mitigate these issues and answer any questions related to scooter implementation with a thorough understanding of scooter regulations. This research is designed to provide cities a range of practices for scooter regulations without elevating any regulatory practice as best. Ultimately, this research can be used as a guide for cities when signing an agreement with a scooter company. To determine the range of regulatory practices for cities, a process of documentation review of scooter program precedent across 50 cities in the United States was undertaken. The programs that were reviewed in this study were exclusive relationships between cities and companies. From this documentation review emerged three core requirements for scooter operations; legal, operational,

and financial. Each requirement is comprised of specific components. With this range of practices for the legal, operational, and financial requirements for successful scooter operations, a city should be more than prepared to properly regulate and allow scooters in their city.

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Dedication

To my brother Brodie.

Chapter 1 - Introduction

Electric Scooters

Micro-mobility, an affordable, urban transportation solution that covers 5 miles or less (Runnerstrom, 2018) is a new, urban trend in transportation that revolves around dockless bicycles, pedestrian-only areas, autonomous vehicles (self-driving cars that do not require a human driver), and now, dockless electric scooters (Runnerstrom, 2018). Dockless systems are systems that do not have specified parking stations. Dockless electric scooters (hereby referred to as "scooters"), an integral part of the new micro-mobility trend, are two-wheeled vehicles, fitted with an electric motor that can reach speeds relative to cars – typically, 15 to 30 mph. Scooters are meant to be accessible and easy to use and are being manufactured and deployed by companies worldwide (Frangoul, 2018). Scooters allow users to travel short distances, thus saving time and reducing their carbon footprint (Frangoul, 2018). The potential for scooters to reduce the carbon footprint of users even prompted Ford Motors to invest in scooters, citing a desire to help reduce pollution, ease traffic congestion in cities, and reduce parking constraints (Doubek, 2018).

To use a scooter, users can purchase a ride via their smartphone after downloading the app of the applicable scooter company. Users are then charged set rates - either per hour or per miles traveled – while in operation. As they are dockless, users can park scooters wherever they please. Where users operate and park scooters, however, has become one of the most prevalent of the list of issues that accompanies scooters.

Issues began to surface almost immediately with scooters, beginning with their initial wave of deployment during the spring and summer of 2018 (Ryan, 2018). At the time of writing, scooters have been deployed in over 100 cities across the United States. More often than not,

scooters have been dropped off without any communication between the city and the company on their implementation (Ryan, 2018). Scooters presented many issues for cities, as mentioned above, and cities often found themselves caught off guard without plans for implementation. Prevalent issues included safety (for both users and non-users), congestion of sidewalks and the right-of-way, and legal and permissible operations (Sweeney, 2018). Ultimately, there was a lack of understanding and data in regards to the safe, legal, and permissible usage of scooters. While scooters are seen as a viable transportation option for many, and companies had good intentions with dropping off scooters, the lack of communication between companies and cities unintentionally created issues with unclear solutions.

Safety and Liability

The first and most pressing issue for cities to consider is the safety of users and non-users alike. This is the most pressing issue for cities as it is tied to the other sections of this chapter (liability, legality of operations, infrastructure, and lack of data). Depending on the motor fitted on the scooter, scooters can reach a top speed of 15 to 30 miles an hour. At that speed, scooters become an issue of public health (Stein, 2018). The American Public Health Association works to promote and protect the health of people and communities where they live, work, and play (American Public Health Association, 2019). At high speeds, scooters threaten the health of users, non-users, and overall safety of communities. Thus, they are not simply just a new technology – they are an issue of public health (Stein, 2018). Injuries can easily occur to users and non-users alike and threaten the public health of a city. Due to threats to safety, cities with uncontrolled scooter operations began to act against scooter companies.

In the short time that scooters had been implemented in Kansas City, Missouri, there was a sharp uptick in injuries. During the initial month of deployment in Kansas City at the HCA

Midwest Health System (Kansas City's largest hospital system) alone, over a dozen injuries due to rider negligence had been treated. Without any warning that scooters were being deployed, cities were unable to educate users on proper usage, and Kansas City was no different. Non-users were also at fault as well in these accidents, however. Just as users were not educated on usage, neither were non-users. And at speeds relative to automobiles, scooters easily caused injuries to users and non-users alike and threatened both the safety and the public health of Kansas City. The litany of injuries and issues to safety and public health eventually prompted a ban of scooters for a short period in Kansas City (Ryan, 2018).

Lack of infrastructure, just like scooter speeds, can bring issues of safety as well as the question of liability. A lack of infrastructure for scooters in much of Kansas City led to driver collisions with users due to confusion on where scooters should operate (Gutierrez, 2018). Similar injuries began to occur in Washington, D.C. and Dallas, Texas. During one week, two fatalities occurred in these two cities within days of each other. In Washington, D.C., a fatality occurred on a scooter due to a driver collision. Earlier in that same week, a rider in Dallas fell off of a scooter and died due to blunt force injuries to his head (Loizos, 2018). Lastly, when injuries such as the above occur, who is held liable? This question, like the issue of safety, confounded cities upon scooter deployment. In the cases seen in Kansas City, Washington, D.C., and Dallas, it was unclear who was liable; was it the user, the driver, the company, or the city? Without regulations, cities had a difficult time answering the question.

Operations

The operations of scooters that cause major issues for cities include parking and the infrastructure on which scooters are operated. A major criticism of scooter programs has been that users leave scooters parked wherever they please, prompting a popular hashtag,

#ScootersBehavingBadly (Ryan, 2018). In fact, scooters had behaved "badly" enough in some cities in California to prompt riot tactics against the scooters. Bird, Lime, and Spin scooters that were abandoned on sidewalks and streets had been lit on fire, hung in trees, had brake lines cut, and smeared with feces - all in an effort to drive away users. "They throw them everywhere: in the ocean, in the sand, in the trash can," a maintenance worker on Venice Beach told the Los Angeles Times (Ryan, 2018). As examined above, scooter companies have been deploying their scooters without proper agreements from cities, leaving a lack of education for users on proper parking practices.

Just as scooters have the potential to cause issues with their parking, they can cause issues related to operations on city-owned infrastructure. Scooters utilize the public right of way and city infrastructure (sidewalks, alleys, and roads alike). BikeWalkKC, an advocacy group for mobility options other than driving in Kansas City, made suggestions to the City of Kansas City regarding safe operations. BikeWalkKC is a non-profit organization that is supportive of modes of transportation that give people options beyond driving. Despite the support for scooters, they were discouraged by Bird dropping scooters off in the City prior to BikeWalkKC and the City establishing any rules or regulations on operations (Ryan, 2018). Before Bird signed an agreement with the City of Kansas City (with the help of BikeWalkKC), scooters quickly become a nuisance; they were being ridden on the sidewalk, the street, and in the Kansas City Streetcar lane; their unregulated usage even prompted a ban on the Country Club Plaza district (a high-density shopping district), citing safety of users, due to a lack of infrastructure, as the reasoning behind the ban.

BikeWalkKC's Executive Director Eric Rogers was discouraged with the implementation of scooters in Kansas City due to the lack of communication between the company and the City

(Ryan, 2018). BikeWalkKC suggestions cleared up questions with operations the city had upon deployment; scooters should seek to keep the right of ways clear, keep sidewalks clear, and keep those in wheelchairs safe (Ryan, 2018). These suggestions were implemented into a new agreement between the City and another scooter company (Ryan, 2018). If these suggestions were implemented before scooter deployment, then Kansas City could have avoided many of the issues and backlash that occurred with initial scooter deployment.

Infrastructure

The three issues discussed above (safety, liability, and operations) are compounded by infrastructure, or the lack thereof in many cases (as seen in Kansas City, Washington, D.C., and Dallas). Scooter companies recommend that users wear helmets (at the onset of purchasing a ride) which is ultimately just a recommendation; it is difficult to enforce. Recommending that users wear a helmet is aimed at mitigating the safety issues regarding scooters. Should a user be forced to ride on the sidewalk, then the helmet will protect the user – but not other pedestrians. On the other hand, should a user be forced to ride in the street (without a protected bike lane), then the user is put in danger by vehicles, despite the presence of a helmet. In both scenarios, there are issues no matter the level of infrastructure present for users to operate scooters.

Kansas City sought to mitigate these issues in the short term with the creation of a temporary "scooter" lane (the only one of its kind in the United State). Oak Street, a major thoroughfare between 17th and 19th streets was reduced to one lane throughout the month of October in 2018 by the organization Better Block KC (Betts, 2018). The lane provided scooter users a safe lane to operate on a street that "…has been plagued with car crashes for people that are driving excessive speeds." Rogers with BikeWalkKC stated (Betts, 2018). While only temporary, the initiative taken to install such a lane - the first of its kind in the United States

(Netsell, 2018) - illustrated a major point with safe scooter operations; infrastructure is lacking across cities in the United States for scooter operations and should be made a priority, just as it was in Kansas City.

Lack of Data and Scholarly Research

The issues above are all compounded by a lack of data and scholarly research on scooters. As they are a new mode of transportation, there is not a plethora of data or precedent on usage, safe operations, liability, operations, or proper infrastructure. Thus, for the purpose of this research, I looked into parallels with bike share, another mode of micro-mobility that is similar to scooter share programs.

Bike sharing began much as scooter sharing programs did; the first bike share program located in the Netherlands, termed "Witte Fietsen (White Bikes)", was not even remotely a success (DeMaio, 2009). Many bikes were found thrown in canals, abandoned, or cluttered on streets. The program lasted mere days because of a lack of education, and mostly, due to the newness of the program. This initial program relates to how scooters were first perceived in many cities; in cities across California, scooters were thrown in the ocean, abandoned in piles, and vandalized. Initially, both scooter and bike share programs were met with disdain from non-users; Witte Fietsen collapsed within days (DeMaio, 2009), while many scooter programs were banned almost within weeks in the United States.

Over the next half-century, bike share programs across Europe integrated new technology on the bikes to prevent safety issues, track customer usage, and provide ample communication between users and companies. Over the course of the latter half of the 20th century, bike share grew from a public nuisance to a worldwide phenomenon; by 2008, bike share programs existed in France, the Netherlands, Brazil, Chile, China, New Zealand, South Korea, Taiwan, and the

U.S. (DeMaio, 2009). Scooter programs are not yet as commonplace as bike share programs, however, they are worldwide, with locations outside of the United States in major cities such as Paris and Tel Aviv ("Bird," 2019).

Scooter share programs have the potential to have great, positive impacts on cities. Bike share programs, like scooter programs, share the same potential for great, positive impacts. These include increased transit usage (by offering a way to complete the last mile to transit) and potential to decrease greenhouse gases (DeMaio, 2009). Velib, a bike share service in Paris, reported that over 28% of its users chose to begin and end multi-leg transit trips in 2009 using bike share. During the previous year, 25% used the service on their return trip from transit, while 21% used the service to reach the transit options. Velib reported over 50 million trips in 2008; this incredible number of users has the potential to reduce millions of pounds of greenhouse gas from entering the environment. In Montreal, Canada, a similar service reported that it had saved over 3,000,000 pounds of carbon since its inception in 2009 (DeMaio, 2009). Like bike share, scooters offer a unique opportunity to further increase transit trips and reduce greenhouse gases from entering the environment. The positive impacts of scooters have yet to be recorded in great number, however, similar benefits and issues can clearly be seen in a bike share services across the world.

Chapter 2 - Methodology and Results

Research Question

Upon being initially deployed in cities, scooters have clearly presented a list of issues regarding safety, liability, operations, and infrastructure. A lack of data and scholarly research on scooters has only compounded these issues. Since they are such a new form of transportation, cities have often found themselves without solutions to these problems. The first step in finding solutions to the issues above is to regulate scooter usage. This is no small task; to regulate scooters properly, there are many factors that go into proper regulation. Precedent exists across the United States of cities attempting and either failing or succeeding to regulate scooter usage. The purpose of this research is to provide cities a range of regulatory practices, without elevating one as best, based on this precedent. These ranges of practices, and ensuing components, will provide cities the information and background they need to know when seeking to allow and regulate scooters in their city. This leads us to the central research question of, what are the components that cities should know when seeking to regulate electric scooters?

Methodology and Reasoning

To answer the above research question, a study of cities across the United States and their approach to regulating scooters was undertaken. Both a quantitative and qualitative approach was taken in this research. There were three phases within this methodology: establishing the sample size, conducting documentation review, and an organization of data. First, a large sample size was established, as there is a wide variation in precedents and factors across the United States regarding scooter regulations. As this research aims to present a wide menu of practices, the large sample size was necessary. Next, the variation in practices was analyzed with a documentation review in cities within the sample size. Lastly, these practices were analyzed for

their components, the components of which were subsequently organized into three master requirement categories for scooter regulations.

Study Sample

The study sample was chosen via a random sample. A random sample was chosen to present scooter regulation scenarios across a wide array of cities of all sizes across the United States. To take the random sample, a list of all cities in the United States that have currently or in the past had electric scooter programs was compiled. The list of cities was gathered from the websites of the following electric scooter companies; Uber (JUMP), Lyft, Skip, Spin, Lime, and Bird. The list of cities totaled 101. Each city was then assigned a number 1 through 101. All cities with an even number were chosen for this study so as to compile an even list of 50 cities. The random sample ultimately produced a list of cities in various stages of scooter implementation. It should be noted that I specifically looked at cities with exclusive relationships with companies and not situations where cities opened themselves up to bids for services. Figure 1 below displays the cities that were a part of this study.

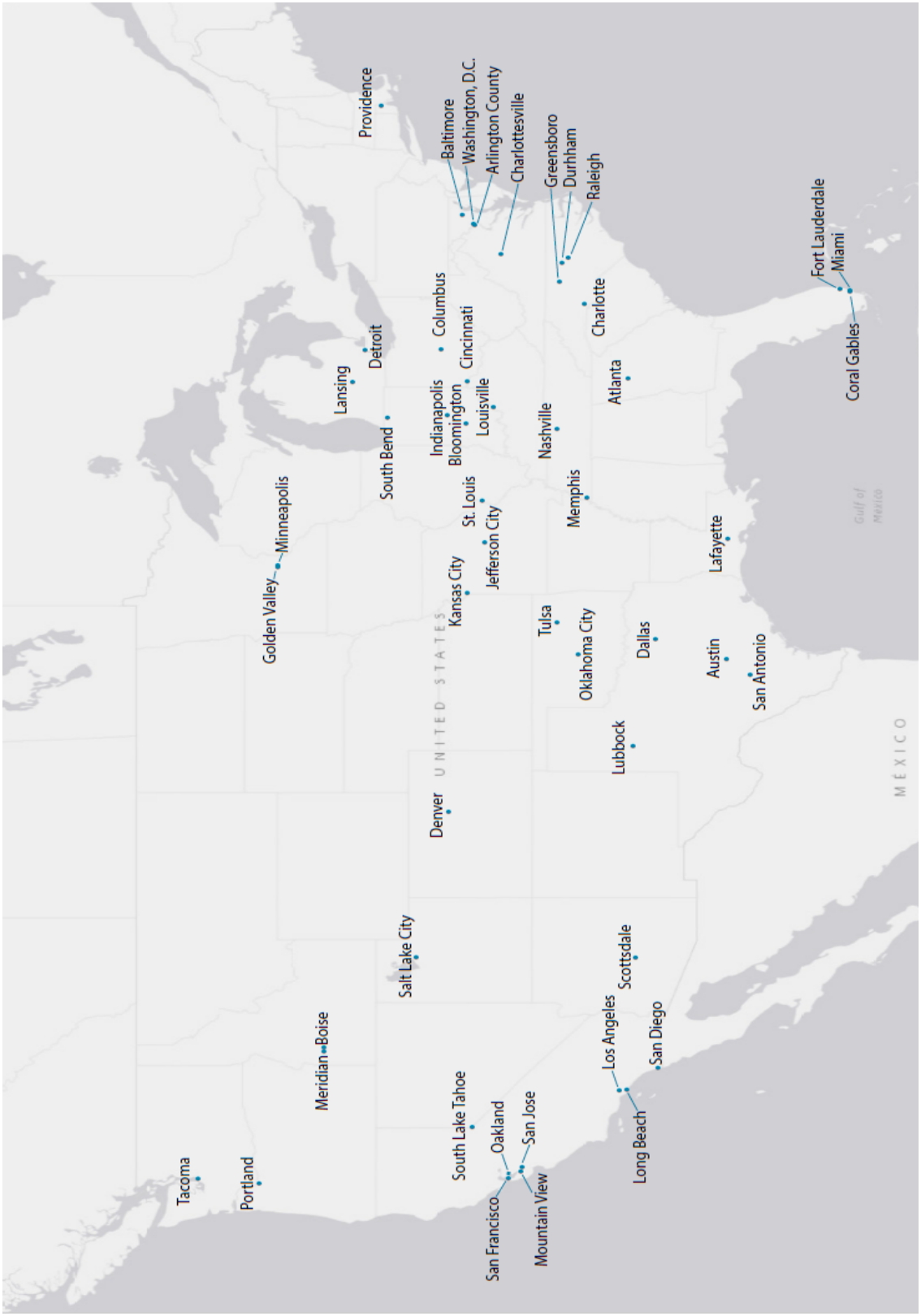

Figure 1: Study sample.

Document Review

For each city that was chosen as a part of this study, all available documentation relating to scooters and their regulations, up to and including local newspaper articles, ordinances, agreements, and blog posts were read and analyzed. Each document was read to determine the components that cities should be aware of when seeking to allow scooters in their city.

Organization of Data

Each component determined from the documentation review was organized based upon where it fell in an organized system. This system designated the components as part of one of three following master requirements for scooter programs: a legal requirement, an operational requirement, or a financial requirement. There was a wide variation in components per each of these requirements determined through this process. The purpose of this research is again to present this variation of practices and subsequent components to cities so they may be aware of scooter regulation precedents across the United States, and then, be knowledgeable in signing agreements with scooter companies. As such, each component of these requirements will be examined in the following chapters.

Chapter 3 - Legal Requirements

Legal Requirements

Legal requirements are those processes that cities must undertake to ensure that scooters operate within a legal framework within their city. These requirements are the first step in establishing scooter operations in cities. The four components that were used in the study sample to establish a legal framework for scooter programs were the mechanism of regulation, the definition of the scooter, legal protections, and financial protections. The mechanism of regulation was the document type that cities utilized when regulating scooters. The definition of scooters is how cities chose to define scooters, which subsequently led to where scooters were legally allowed to operate. Lastly, legal and financial protections provided cities protection for any legal and financial issues that may arise.

Mechanism of Regulation

The mechanism of regulation is the legislative document that regulates scooters in cities. When choosing a mechanism of regulation, cities should ultimately be cognizant of desired amount of control, as well as the time required to establish a scooter program with a given mechanism. Four common mechanisms of regulation were identified in the study sample; ordinances, pilot programs, agreements, and permits. These four mechanisms were utilized in 86% of the cities in the study sample. The other 14% of cities utilized other atypical mechanisms (referred to as “Other” in Figure 2 below) that were not similar to any of these four core mechanisms of regulation, and thus are not discussed as a typical option for the purpose of this research. In 14% of the cities, a combination of mechanisms was utilized, a tactic that offered cities greater stringency in control of scooters. Lastly, 6% of the cities in the study sample utilized no mechanism of regulation. Rather, they chose to take no action to regulate scooters;

this option will not be examined in this subsection, however, it is certainly a viable option for cities to choose should they be confident in regulating scooters without legislation – this laissez faire approach was used in Salt Lake City, where scooters were used and met with open arms (The Salt Lake Scene, 2018).

These different mechanisms of regulation types, combinations, or choice of no action provided cities varied levels of stringency in scooter control, as each mechanism differs in its purpose. Each mechanism type also varies in the time it takes to establish. Figure 2 below displays the frequency of choice for the mechanism of regulation types across the study sample. Figure 2 includes any combinations of mechanisms, thus, the total frequency for mechanism choices exceeded the study sample size of 50.

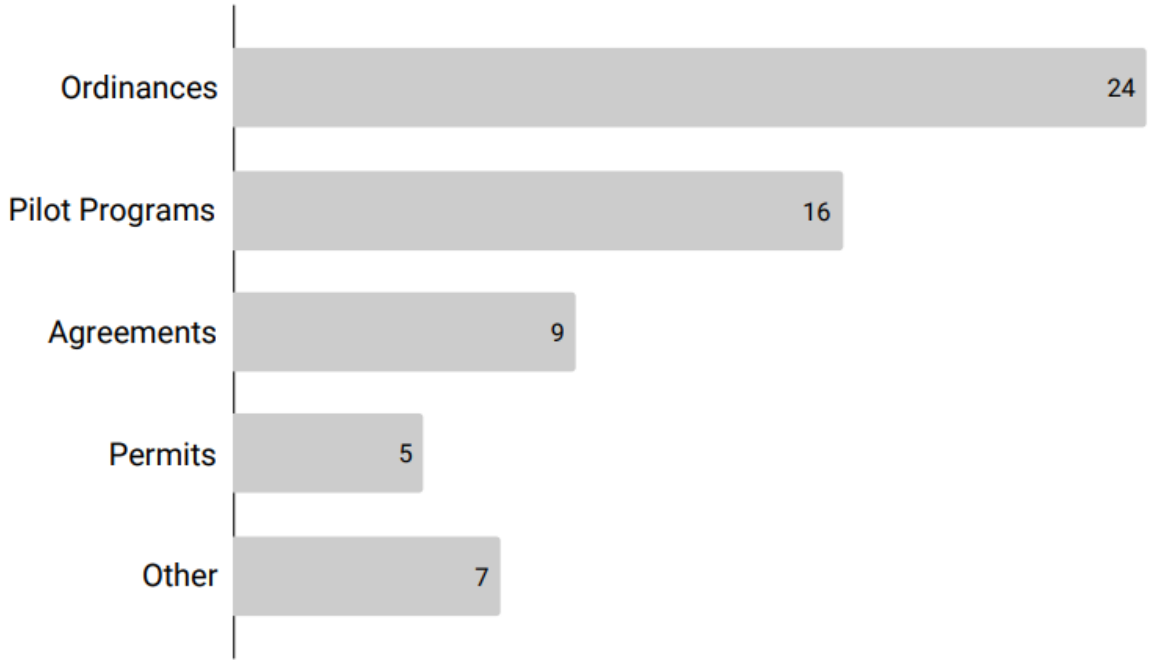

Figure 2: Frequency of choice per each mechanism of regulation type for the study sample. **Other: this category includes 3 instances of cities adding scooters as part of in place bike share, 3 instances of cities doing nothing, and 1 instance of a city requiring the company to sign*

an indemnification agreement. As referenced above, these mechanisms were not typical across the study sample and are thusly not considered a core mechanism of regulation type for the purpose of this research.

The most common mechanism choice for cities in the sample study was the ordinance, with 48% of cities utilizing this option to regulate scooters. Ordinances are legislative documents or laws that are passed by a municipal government and substitute the subject matter of law (Hill & Hill, 2005). As ordinances act as law, they can aptly guide principles and procedures for scooter operations. Ordinances present the highest level of stringency in scooter control for cities that chose this mechanism. As a written law, ordinances offer great control: however, as a written law, they are not easily changed and take considerable time to establish. The only way for an ordinance to be reversed, changed, or repealed is if the legislative body that passed it takes such an action. Both Dallas and Oakland, California (City of Dallas, Texas, 2018; Kapland, Gallo, 2018) utilized the ordinance as their regulatory mechanism.

The second most commonly chosen mechanism was the pilot programs, with 20% of cities utilizing this mechanism. Pilot programs are small-scale, short-term experiments that help cities learn how a large scale project might work in practice (Rouse, 2013). Pilot programs provide cities a way to properly explore future parameters of operation. These programs typically led to the passing of ordinances, an agreement, or a permit. Pilot programs, as experiments, are much easier to repeal than ordinances. However, as they are merely experiments and not law like ordinances, they do not offer the same control over scooter programs as ordinances - as referenced above ordinances are written law, and the violation of an ordinance substitutes fines or legal action more severe than a violation of a pilot program (Hill & Hill, 2005). Secondly, pilot programs take considerable time to establish just as ordinances, thus cities are not able to

quickly establish scooter programs with the pilot program option. Cities in the study sample that chose the pilot program mechanism did so to experiment with scooter operations and establish future parameters of operations. Two cities that chose to utilize the pilot program were Denver, Colorado, and Baltimore, Maryland (City of Baltimore, Maryland, 2018; Denver Public Works, 2018). Denver chose to implement a 1-year pilot program to properly explore how electric scooters could provide accessible multi-modal transportation to users of all levels of income. While exploring the parameters of operation, Denver also sought to encourage scooter usage (Denver Public Works, 2018). As a pilot program's purpose is to be an exploratory program, and Denver desired to explore the newness of scooter programs, a pilot program was the ideal choice. (Denver Public Works, 2018).

The third and fourth mechanism of regulation options utilized by cities were agreements and permits. These two mechanisms are very similar. Agreements are simply legal contracts between the city and the company that give the authorization to operate scooters in the city, and typically include the details of an exchange of money, the time period, and a delineated exchange of services. Permits are more administrative, in that they typically manage the details of operation without the legal obligation of an agreement. They are similar to agreements in that they provide the same details. Both agreements and permits can easily be rescinded or canceled should the need arise (City of Kansas City, Missouri, 2018) and take significantly less time to establish than an ordinance or pilot program. Should a city desire scooters quickly, then an agreement or permit is the best option. However, they do not offer the stringent control that an ordinance does (as they are not written law), nor do they allow cities to be as exploratory in their operations with scooters as pilot programs do. These two mechanisms were chosen by 18% and 10% of cities respectively in the study sample. Memphis, Tennessee and Raleigh, Carolina chose to utilize

agreements (City of Memphis, 2018; Raleigh City Attorney's Office, 2018). Washington, D.C, and San Francisco, California chose to utilize the permit option. (Government of the District of Columbia Department of Transportation, 2018; SFMTA, 2018).

Definitions of Scooters

What a scooter is must be defined before being deployed. The definition of a scooter prompted the operation zone for scooters across the study sample, thus, cities should define scooters based upon where they desire to allow scooters to operate (if they are not constrained by state laws, as explained below). There was a wide variation in what a scooter was defined as across the study sample. Definitions across this study are seen below in Figure 3. Only 10 states in the United States define what scooters are; for the cities in this study, Washington, Virginia, California, Minnesota, Texas, Indiana, Colorado, Arizona, Michigan, and state law applied (Bergal, 2018). Otherwise, the other cities not in these states were able to use their own definition for scooters.

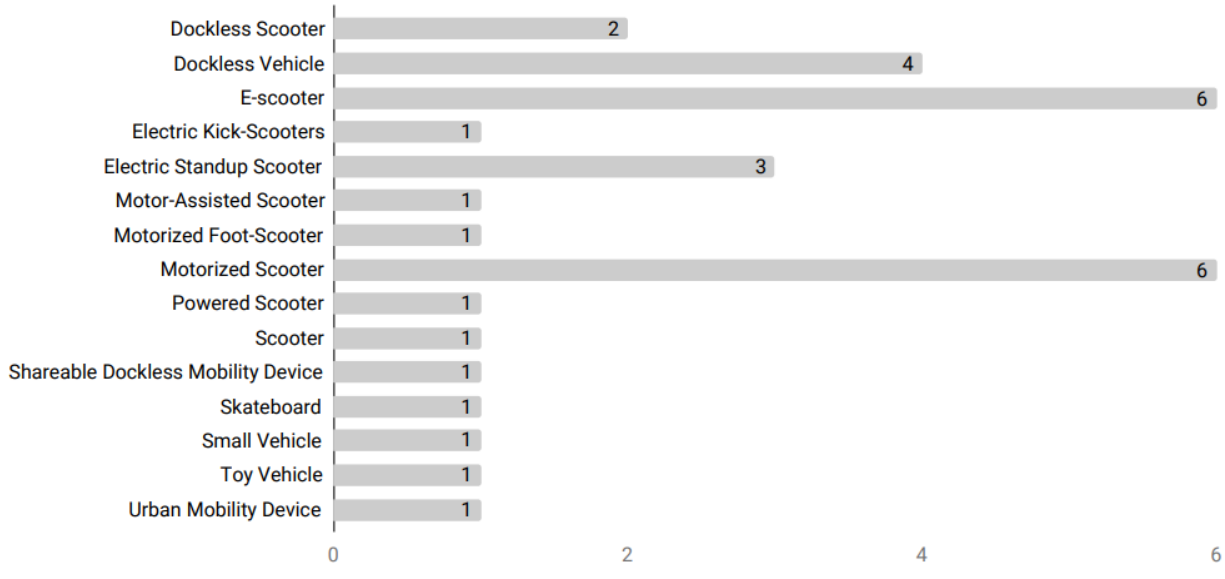

Figure 3: All definitions and their frequency across the study sample.

Both Detroit, Michigan and Denver, Colorado were constrained by state law for their definition of a scooter, thus they were already defined for them. Detroit (and thus Michigan's) definition for a scooter ("small vehicle") prompted Detroit to prohibit the use of scooters on sidewalks. Detroit went further in specifying that when being operated on the roadway, users are required to utilize the most far right lane that is possible (Brundidge, 2018). The City of Detroit also prohibited scooters in the Central Business District as did a host of other cities including Dallas (Brundidge, 2018; City of Dallas, Texas, 2018). Denver (and thus Colorado) chose to define scooters as "toy vehicles" (Denver Public Works, 2018), prompting scooters to only be allowed to operate on sidewalk; they were not fully defined as vehicles. If cities are not constrained by state law for scooters, then the definition should be crafted to determine the operation zone.

Legal and Financial Protection

Both protections are necessary in the event of injury to users and non-users alike or in the event of damage to city property. First, to protect the city from legal issues, liability must be established. Second, to protect the city from financial issues, there must be insurance, taken out by the company, to cover damage to city property and to cover injuries of users and non-users alike. Legal and financial protection was provided by indemnification agreements and insurance policies, respectively, across the study sample.

Liability

Liability is the state of being responsible for an action; establishing who is liable in the event of a scooter accident is important for cities. Liability should be, and was, established as the company's prior to deployment by cities across the study sample. As referenced above, the establishment of liability protects the city in the event of legal issues. Agreement of the

establishment of liability (between the city and company), and thus protection from legal action on behalf of the city, was provided by indemnification agreements. Indemnification is security against legal liability for one's actions. Indemnification agreements are both security against legal liability for the scooter company's actions as well as an agreement that compensates the city for any losses that may occur during scooter operations – they are ultimately about legal and financial protection for cities (Kraus, n.d.). These agreements protected cities from legal action on the behalf of users, while also providing them protection in the event of a financial issue.

34% of cities across the study sample required that companies sign indemnification agreements prior to beginning operations. There were two typical indemnification agreements found in the study sample. The first was a "general indemnification agreement" that required that the company defend, hold harmless, and indemnify the city and all related agencies from and against all claims, damages, liability, losses, costs, and expenses resulting from any and all acts related to scooter operations (City of Kansas City, Missouri, 2018). The second typical indemnification agreement, also found in 34% of cities, was an "indemnification for professional negligence" agreement. This agreement required that the company defend, hold harmless, and indemnify the city and all related agencies from and against all claims, damages, liability, losses, costs, and expenses should the company choose to hire an outside architecture, engineering, or other professional firm to design and manufacture scooters (City of Kansas City, Missouri, 2018).

Insurance

Scooters are a considerable risk to cities; as such, cities should be insured against potential losses financially, in the event of liability, or in the event of a data breach. To insure themselves in such events, 46% of cities across the study sample required that insurance be taken

out by the scooter company. Of these cities, 15 provided specifications for said coverage; the remaining 8 cities merely stated that the company provide proof of insurance, or, that insurance in some form be taken out by the company (City of Durham, 2018; City of Fort Lauderdale, Florida, 2018; Gindling, 2018; Kapland, Gallo, 2018; Spillar, 2018). A typical insurance policy for cities began with the requirement that the insurance company is authorized to operate in the given state that a city is located, is acceptable to the city, and does not violate ownership or operational control. Operational control is the authority to perform functions of command over scooter operations by the company (City of Dallas, Texas, 2018).

Table 1 below was derived to show the specific policies and their required coverage found in those 15 cities that provided specifications. These policies include Worker's Compensation, Commercial General Liability, Automobile Liability, and Employer's Liability Insurance. The final category, City Officials, was not a specific policy, however of these cities, it was typically a requirement to include City Officials as an additional insured.

Table 1: Insurance policy requirements and coverage required.

City	Worker's Compensation	Commercial General Liability	Automobile Liability	City Officials	Employer's Liability
Arlington County, VA	State required coverage	$1,000,000 per occurrence, $2,000,000 aggregate	$1,000,000 combined single limit	--	--
Baltimore, MD	State required coverage	$1,000,000 per occurrence, $3,000,000 aggregate	$1,000,000 per occurrence	Listed as additional insured	--

Charlottesville, VA	State required coverage	$1,000,000 per occurrence	$1,000,000 per occurrence	Listed as additional insured	$100,000
Dallas, TX	State required coverage	$1,000,000 per occurrence, $2,000,000 aggregate	--	--	$500,000 for each accident, $500,000 for disease policy limit, $500,000 per each employee with diseases
Indianapolis, IN	--	$1,000,000 per occurrence	--	Listed as additional insured	--
Kansas City, MO	State required coverage	$2,000,000 per occurrence, $2,000,000 aggregate	$2,000,000 per occurrence	--	$100,000 for each accident, $500,000 for disease policy limit, $100,000 per each employee with diseases
Louisville, KY	--	$1,000,000 per occurrence, $2,000,000 aggregate	$1,000,000 per occurrence	--	$100,000 for each accident, $500,000 for disease policy limit, $100,000 per each employee with diseases
Meridian, ID	--	$1,000,000 per occurrence	--	Listed as additional insured	--
Nashville, TN	--	$2,000,000 per occurrence	$1,000,000 per occurrence	--	--
Providence, RI	--	$1,000,000 per occurrence	--	Listed as additional insured	--
San Antonio, TX	State required coverage	$1,000,000 per occurrence,	$500,000 per occurrence	--	$500,000 for each accident, $500,000 for disease policy limit,

		$2,000,000 aggregate			$500,000 per each employee with diseases
San Francisco, CA	State required coverage	$2,000,000 per occurrence, $4,000,000 aggregate	$2,000,000 per occurrence	Listed as additional insured	Not less than $1,000,000 for each accident, injury, or illness
Washington, D.C.	District required coverage	$1,000,000 per occurrence	--	Listed as additional insured	--

(City of Baltimore, Maryland, 2018; City of Charlottesville, Virginia, 2018; City of Dallas, Texas, 2018; City of Kansas City, Missouri, 2018; City of Meridian, Idaho, 2018; City of Nashville, Tennessee, 2019; City of San Antonio, Texas, 2018; City-County Council of the City of Indianapolis and of Marion County, Indiana, 2018; County Board of Arlington County, Virginia, 2018; Fischer, 2018; Government of the District of Columbia Department of Transportation, 2018; Morabito III, 2018; SFMTA, 2018).

If a city required that the company take out Worker's Compensation, it was to provide wage replacement and medical benefits to employees of the company who are injured in the course of employment. The coverage required by cities was typically based upon state limits for Worker's Compensation. Next, each city required that the company take out Commercial General Liability insurance. This insurance covers bodily injury, personal injury, and property damage – all of which are likely to occur with scooter operations. Automobile Liability insurance is financial protection for a driver of a scooter who harms someone else, city property, or scooters themselves. Lastly, Employer's Liability insurance was required to be taken out by companies to pay compensation for costs and legal fees should an employee or ex-employee sue the company in the future. All of these insurance policies serve a different purpose, but each

serves an important function for cities in protecting cities from injuries, damages to vehicles and city property. The policies that provide these protections are essential to protecting cities during scooter operations. These insurance policies also provide wages and benefits to employees of companies, or protection in the event that a lawsuit is pursued against the company. All of these insurance policies ultimately prove that the company is fit to operate in the city.

Aside from these typical core insurance policies required by cities, Cyber Liability and Information Technology insurance was required to be taken out by both Charlottesville, Virginia and San Francisco, California. This insurance policy type protected these cities for up to $1,000,000 per claim, including coverage for costs for 3rd party notification, credit monitoring, and fraud protection (County Board of Arlington County, Virginia, 2018; SFMTA, 2018). This insurance is vital as protection in the event of a data breach involving sensitive customer information.

Chapter 4 - Operational Requirements

Operational Requirements

Operational requirements regulate the routine functions and activities of scooters through fleet regulations, safety measures, strong communication, user education, and data sharing and privacy. The regulation of routine functions of scooters ensures that they do not become a public nuisance, are safe for consumers, and meet an expected level of service. Fleet regulations include the fleet size (both initial and subsequent expansion) and rebalancing deployed scooters to avoid overconcentration. The safety measures that cities used in this study included parking requirements, preventing attachment to fixed and moving objects, and requiring equipment on scooters be held to a strict standard. These safety measures helped to prevent injuries from occurring to users and non-users alike. Cities across the study sample required strong communication between the city and company as well as the company and users. Strong communication helped to remove unsafe scooters, prevent scooters from becoming over-concentrated, and keep scooter companies transparent in their operations. User education refers to the education of users on safe and legal scooter usage. User education was an emphasis for cities in this study that had successful programs. Lastly, data on vehicles, users, usage, and community perceptions on scooters were used to enhance or reduce scooter operations.

Fleet Regulations

The establishment of fleet regulations begins with establishing the fleet size. There are two steps to establishing a fleet size – one, setting the number of scooters for the initial fleet size, and two, establishing parameters for subsequent expansion of the fleet size. The initial fleet size is the set number of scooters that a scooter company can deploy at the onset of a scooter program. Subsequent expansion refers to an increase of the fleet size should it be deemed necessary.

During both processes, cities should be cognizant of the potential for over-concentration, over-crowding, and meeting expected levels of service (City of Dallas, Texas, 2018).

There were two options found in the study sample when beginning the process of setting an initial fleet size: specify a size or not specify a size. These options refer to the city setting a limit on scooters deployed in their city or not. 44% of cities in the study sample chose to specify size and thus were proactive in preventing over-concentration or overcrowding of scooters. 56% chose to not specify a scooter limit to a company, and thus did not have as much control over the potential for scooters to become over-concentrated or overcrowd the city as those cities that did specify a fleet size. However, those 54% of cities had better potential to meet expected levels of service than those who played it safe and specified a smaller fleet size. It was not clear if the cities that chose to specify an exact number of scooters truly had more successful programs than those who did not, however, there is certainly a relationship to be inferred between control over the number of scooters and a lesser chance of over-concentration or over-crowding (per the total number of scooters in operation). There is also an inferred relationship between having a larger fleet size and meeting or exceeding expected levels of service. The frequency of choices when choosing one of these two options can be seen below in Figure 4.

Figure 4: Frequency of choices for cities in the study sample when choosing to specify or not specify an initial fleet size.

There appeared to be a strong relationship between the population and initial fleet size across the study sample. Figure 5 below was charted to further derive this strong relationship between population and initial fleet size. The cities that were used for Figure 5 are those that specified an initial fleet size. The equation that accompanies Figure 5 can be used to formulate a fleet size based upon the rates seen in cities that specified an initial fleet size.

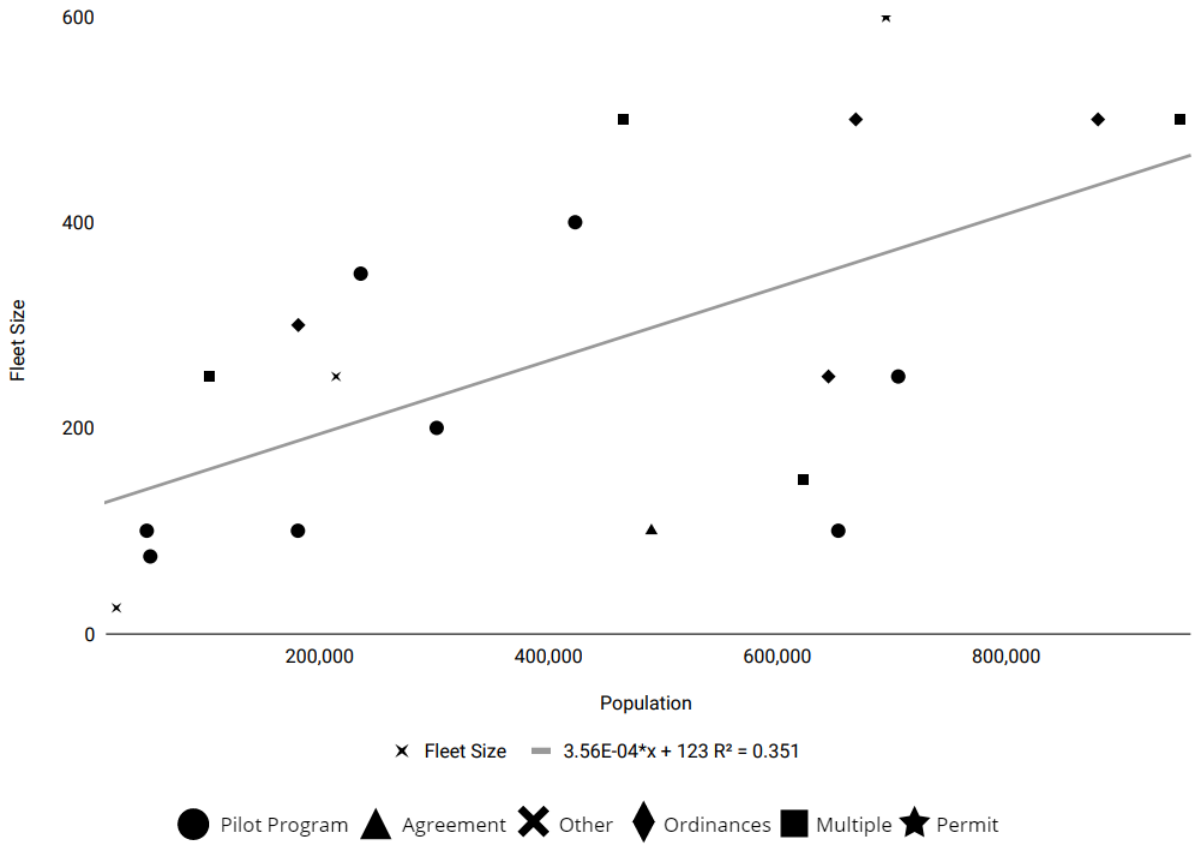

Figure 5: Population versus initial fleet size.

This chart shows this clear relationship between population and initial fleet size; as populations increase, so too does the initial fleet size. The relatively low r-squared for this model does not tell the whole story on the relationship between population and initial fleet size, however, it does provide an estimate for the strength of the relationship between population and initial fleet size.

The second step in establishing the fleet size, subsequent expansion, was typically based upon data on usage across the study sample. When allowing fleet expansions, cities kept the same factors in mind as they did when establishing an initial fleet size; being mindful of preventing over-concentration, over-crowding, and meeting an expected level of service. To

prevent these factors from occurring, cities required that the scooter company provide proof from data on usage that expansion was warranted. Two cities, Arlington County, Virginia and Austin, Texas required that in order for a fleet expansion to occur (by 50 devices), the company must demonstrate at least 3 trips per device per day over a full month (County Board of Arlington County, Virginia, 2018; Spillar, 2018). Louisville, Kentucky, required that should the company desire to increase fleet size (by an ungiven amount), that they be able to demonstrate at least 4 trips per device per day over a full month (Fischer, 2018). The rate of 4 trips per day per device was the typical rate for expansion provided by over two thirds of the study sample.

Upon being deployed, scooters, no matter the fleet size, can quickly become over-saturated in high traffic areas for scooter usage. To combat this issue, 20% of cities in the study sample created rebalancing standards and plans. Rebalancing refers to moving over-concentrated scooters, or, moving scooters to preferred or designated locations. Rebalancing helps scooters meet their expected level of service (Denver Public Works, 2018), and is often used to remove scooters parked in prohibited zones. To prevent users from even entering prohibited zones (a non-preferred area), the city of Detroit utilized geo-fencing, a technology that warns users that they are entering a prohibited zone (geo-fencing is utilized via an application programming interface). Typical preferred areas for scooters across the study were high traffic pedestrian areas, low-income areas of the city, and transit stops (Denver Public Works, 2018). Rebalancing typically occurs at all times of the day or in the event of severe weather. Cities typically required that companies have a plan to remove scooters from circulation in the event of severe weather (City of Fort Lauderdale, Florida, 2018). Where the scooters are to be stored was unclear, however – this issue should be decided between the company and the city. Rebalancing is already standard practice for Bird and Lime, two scooter companies, which was helpful for cities

when seeking to implement rebalancing standards. These two companies offered a paid job to those who wished to pick up and charge scooters overnight, and then, rebalance scooters to preferred locations ("Bird," 2019; Lime, 2018). The rebalancing job offered by these companies answered the issue of charging for scooters; those who offer to rebalance charge them overnight at their place of residence or business.

Rebalancing scooters first prevents scooters from becoming a public nuisance should scooters be over-concentrated. Rebalancing them to a new location such as a high demand area or an opportunity area also helps to meet expected levels of service and more users. A typical rebalancing plan required that scooters be moved to an area of high demand or an opportunity area within 2 hours of receiving notice on an issue such as parking illegally from a customer or within 12 hours of receiving notice from a city official. High demand areas are those areas that are expected to generate the greatest number of users (City of Dallas, Texas, 2018). Along with rebalancing scooters to high demand areas, rebalancing scooters to opportunity areas for equitable access was a requirement for 10% of cities in the study sample. These "opportunity areas" included the city core, designated opportunity areas, and high priority opportunity areas where the greatest number of vulnerable populations are located (Denver Public Works, 2018). Vulnerable populations include racial or ethnic minorities, socioeconomically disadvantaged, or those with inadequate access to transit (Denver Public Works, 2018). Denver offered incentives (the extent of which was unclear) for companies to stay committed to opportunity areas (Denver Public Works, 2018).

Safety Measures

The following measures comprise the safety measures component. These measures including parking regulations, attachment of scooters to vehicles and fixed objects, and

equipment standards for scooters. These measures work to both enhance and maintain safe operations for scooter users, keep non-users safe, and work to keep scooters from becoming a public nuisance.

Parking

The parking component refers to parking regulations found across the study sample. Parking regulations include both the manner that scooters are parked in as well as where they are allowed to be parked. Should scooters not be regulated on parking, they pose considerable risks to non-users safety and have the potential to becoming over-crowded or over-concentrated. Typical parking regulations mandated that the scooters be parked in an upright position, on a hard surface, in a manner that does not block access to utilities, crosswalks, ADA access, pedestrian or vehicular paths, or obscure the sight triangle. Doing so prevents scooters from becoming a public nuisance, becoming over-crowded or over-concentrated, and keeps pedestrians and vehicles safe.

Where scooters were allowed to be parked had more variation than the manner across the study sample. Figure 6 below shows the variation in where scooters were allowed to be parked, by percentage, across the study sample. The locations found in the study sample were the sidewalk, street, against buildings, against street furniture, in designated parking spots, and against an unmarked curb. Street furniture refers to signs, benches, transit stops, and posts. Designated parking spots are both temporary and permanent parking spots that were created for scooter parking with paint or another mechanism. Should a scooter be parked outside of these zones or in a manner that is illegal, both the user and the company faced fines across the study sample (as examined later in the Fines section, only 10% of cities had available information on fine amounts). The manner in which cities obtained this money was unclear.

36% of cities that did not specify where they could be parked did mandate that they should be parked upright, on a hard surface, in a manner that does not cause issues (City of Tulsa, Oklahoma, 2018). 64% of cities in the study sample chose to specify where scooters could be parked, which is where the locations for Figure 5's purpose were derived. Of those cities, 44% allowed that scooters be parked in multiple locations.

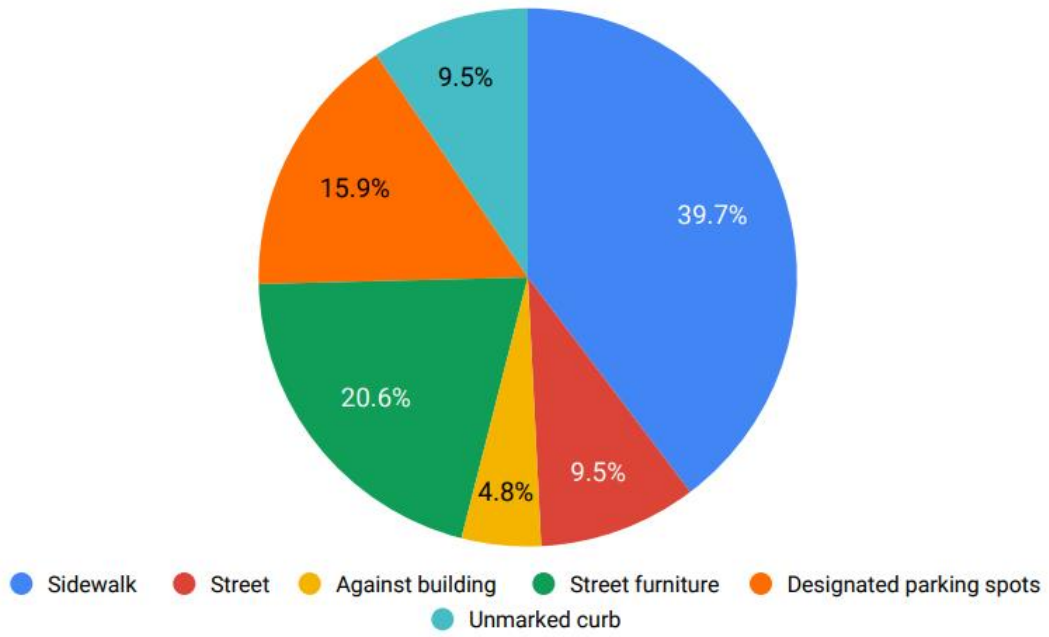

Figure 6: Frequency of choice for scooter parking locations.

As can be seen, the majority of cities allowed parking on sidewalks (39%) and against street furniture. Allowing parking against buildings was the least typical option, as cities often cited concern over scooters cluttering entrances to buildings (City of Tulsa, Oklahoma, 2018). The 64% of cities that chose to specify where scooters could be parked exhibited greater control over scooter parking than those cities did not. However, it was not clear that those that did not specify a given location had less successful programs. Specifying at the very least that scooters

must be parked upright, on a hard surface, and in a manner that does not cause issues is crucial to keeping scooter parking from becoming a public nuisance. Further specifying a location helps to provide greater control over scooter parking, however, and should be considered if there are infrastructure or safety concerns in a city. If no regulations are given, then scooters are doomed to become a nuisance and cause issues with over-concentration, over-crowding, and safety.

Attachment

Attachment refers to the attachment of scooters to fixed or moving objects. Attachment of scooters to fixed objects, including trees, parking meter posts, street light posts, traffic signal posts can lead to scooters becoming public nuisances and also impede the normal and reasonable movement of pedestrians or other traffic (Reich, 2018). The attachment of scooters to moving objects such as vehicles brings with it the question of user safety as well as liability. Attachment of scooters to vehicles was typically referred to as "clinging to motor vehicles" across the study sample. Moving objects typically were deemed automobiles or trailers. In Boise (City of Boise, Idaho, 2018), persons riding or operating scooters were prohibited from attaching themselves or such scooters to a moving motor vehicle. Prohibiting attachment of scooters to fixed or moving objects was only specified by 14% of cities in the study sample, however, the remaining cities merely stated that attachment in itself was prohibited. Table 2 below shows the cities which prohibited such actions of attachment, and if they prohibited attachment to fixed or moving objects.

Table 2: Attachment of scooters to fixed or moving objects across study sample.

City	Fixed objects	Moving objects
San Antonio, TX	X	--
Minneapolis, MN	X	--
Boise, ID	--	X

Charlotte, NC	--	X
Scottsdale, AZ	--	X
St. Louis, MO	--	X
San Diego, CA	--	X

(C*ity of Boise, Idaho, 2018; City of Charlotte, North Carolina, 2018; City of San Antonio, Texas, 2018; City of San Diego, California, 2018; City of Scottsdale, Arizona, 2018, 2018; Reich, 2018; Werner, 2018).*

As seen in Table 2, attachment to moving objects was a greater concern than attachment to fixed objects for cities. Attachment of scooters to moving objects raises concerns over safety more so than attachment to fixed objects, which is a reasonable explanation for this trend. Cities at the very least should prohibit scooter attachment to moving objects to protect users, and then further specify which fixed objects scooters cannot be attached to.

Equipment

Equipment refers to the set of articles and materials that comprise the physical scooter device. Safe and functional equipment is paramount to providing a safe product for the user, a product that does not create parking issues, and issue free operations. All scooters in operation should be 100% maintained and 100% functional at all times – if not, they should be removed from circulation until all parts are repaired and replaced (Brundidge, 2018). Scooters should lastly be equipped to handle the rigor of being outdoors. If the product is safe and functional, then the chance of serious injury is lessened, and, a scooter program has a greater chance to succeed and prosper into the future.

To provide the best product possible, scooter companies should be required to meet a given industry grade standard for equipment – such as the Code of Federal Regulations (City of

Durham, 2018) or the United States Consumer Product Safety Commission (City of Boise, Idaho, 2018). This industry grade standard refers to equipment that has higher quality and durability than consumer grade equipment and materials (Goodyear & Dickerson, 2019). Consumer grade equipment and materials used for commercially available scooters typically have shelf lives less than 30 days, with 7" diameter wheels, a 20-mile maximum range, and single wheel brakes. Consumer grade equipment like this is not acceptable for industry use (Goodyear & Dickerson, 2019). Consumer grade equipment, in particular the small wheels and single wheel brakes, is not suitable for scooters in operation, especially when seeking to have the safest and most efficient product possible in use (Goodyear & Dickerson, 2019). Specifying the equipment be held to a certain standard on scooters is vital to providing the best product possible.

34% of cities in the study sample specified that the equipment on scooters be held to a given industry standard. The other 66% did not have specifications or descriptions for the equipment and merely stated that either all or specific equipment must meet a given industry standard or definition that a city has for a scooter. It was not clear that cities without equipment specifications had less success than those cities that did have equipment specifications, however, those that did had greater control over the standard in which scooters were held.

Table 3 below displays said equipment found across the study sample, its purpose, the issue that the equipment addresses (safety, parking, or operations), and an example standard specification required by cities. The set standard that the equipment and materials for these cities met was unclear (be it the Code of Federal Regulations or the United States Consumer Product Safety Commission).

Table 3: Equipment purpose, issue it addresses, and an example specification.

Equipment	Purpose	Safety	Parking	Operations	Example Spec.
Lamps/reflective headlights	Front and rear lights that are visible from a given distance	**X**	--	--	Visible from at least 500 feet at night and stays illuminated for 90 seconds after scooter has stopped – St. Louis, MO
Horn/bell	Sound mechanism to alert users and non-users alike	**X**	--	--	Scooters may not be operated without a working bell, horn, or another sound mechanism – San Antonio, TX
GPS	Used to track scooter locations	**X**	**X**	**X**	GPS pings scooter company's mobile platform no less than every 90 seconds – Durham, NC
Sticker	Identify scooters or company contact	**X**	**X**	**X**	Include companies contact information, unique VIN, and logo – Kansas City, MO
Motor/governor	To provide assisted power/prevents scooters from exceeding a maximum speed	**X**	--	**X**	A motor cannot allow for speed to top 15 mph – Detroit, MI

Front and rear brakes	Stop or slow scooters	**X**	--	--	Must be able to perform a braked wheel skid(s) on pavement – Scottsdale, AZ
Front and rear wheels	Provide stable riding capability	**X**	--	--	In alignment and spokes, hubs, and axles are tightened and free of damage or wear – Detroit, MI
Front and rear fenders	Prevent road spray from being thrown into the air by tire rotation	**X**	--	**X**	Clean and free of damage or wear - Detroit, MI
Handlebar	Used to hold onto and grasp when operating scooter	**X**	--	--	Bearings are tightened, handlebars turn through a full range of motion, and handlebar covers are free of damage or wear; any attachments to the handlebar are tightly affixed – Detroit, MI
Lockdown capability	To stop scooters that are operating outside of a set operation zone	**X**	--	**X**	Capable of lock remote lockdown by the company or city – Detroit, MI

Platform	Used to stand upon when operating a scooter	**X**	--	--	Structurally sound and free of damage or wear – Detroit, MI
Kickstand	Used when parking scooter to keep scooter upright	--	**X**	--	Stable, structurally sound, and free of damage or wear – Detroit, MI

(Brundidge, 2018; City of Kansas City, Missouri, 2018; City of San Antonio, Texas, 2018; City of Scottsdale, Arizona, 2018; Werner, 2018).

As can be seen, Detroit had the most extensive standards for equipment. Table 3 shows that the kickstand, platform, handlebar, horn, lamps, fenders, wheels, and brakes, are all equipment that were typically required to be stable, sound, and free of damage or wear. The table further shows that the wheels were typically required to be free of damage and a diameter that is greater than the consumer grade (7" in diameter) standard. Lock-down capability and GPS help were required to regulate where scooters operate. The motor speeds varied across these cities, however, it should be noted that motor speed allowed is tied to the definition of the scooter (as a scooter is defined, it may be operated on the sidewalk or street, thus leading to the speed the scooter may operate at). Lastly, a sticker with a VIN (vehicle identification number) and contact information was typically required to be present on every scooter so as to provide users and non-users alike a means to report issues with scooters such as parking or a handlebar issue. The equipment specifications above in Table 3 were ultimately set with the intent to create a safe, functional (in regards to parking) product for users, and, a product that does not hinder scooter operations. Table 4 below was derived to expand upon these equipment specifications on a city by city basis. Table 4 displays specifications for all equipment that was required by cities to be

on scooters (excluding the obvious equipment of kickstand, platform, handlebar, horn, lamps, fenders, wheels, and brakes). A "yes" denotes that these cities required this equipment item on the scooter.

Table 4: Standards for equipment present on scooters on city by city basis.

City	Lamps (visibility)	Bell	GPS	Sticker	Motor speed	Remote lockdown capability
Detroit, MI	500 ft. (front)	Yes	Yes	Yes	15 mph	Yes
Nashville, TN	--	Yes	--	Yes	20 mph	--
San Antonio, TX	500 ft. (rear) 50-300 ft. (front)	Yes	--	--	20 mph	--
San Diego, CA	--	Yes	--	Yes	25 mph	
Baltimore, MD	Unclear, but lamps required	--	--	Yes	N/A	--
Boise, ID	500 ft. (front) 50-300 ft. (rear)	Yes	--	--	20 mph	--
Arlington County, VA	--	Yes	--	Yes	10 mph	--
Charlottesville, VA	300 ft. (front and rear)	--	Yes	--	15 mph	--
Scottsdale, AZ	500 ft. (front) 500 ft. (rear)	--	--	--	20 mph	--
Fort Lauderdale, FL	--	--	Yes	Yes	15 mph	--
Austin, TX	500 ft. (front) 500 ft. (rear)	--	Yes	Yes	20 mph	--

Louisville, KY	300 ft. (front) 300 ft. (rear)	--	--	Yes	15 mph	Yes
Indianapolis, IN	500 ft. (front) 500 ft. (rear)	Yes	--	Yes	20 mph	--

(Brundidge, 2018; City of Baltimore, Maryland, 2018; City of Boise, Idaho, 2018; City of Charlottesville, Virginia, 2018; City of Fort Lauderdale, Florida, 2018; City of Nashville, Tennessee, 2019; City of San Antonio, Texas, 2018; City of San Diego, California, 2018; City of Scottsdale, Arizona, 2018; City-County Council of the City of Indianapolis and of Marion County, Indiana, 2018; County Board of Arlington County, Virginia, 2018; Fischer, 2018; Spillar, 2018).

As can be seen, both lamp visibility distance and motor speed varied across the sample of cities. Lamp visibility distance was typically required to be no less than 300 feet for the front of the scooter and no less than 50 feet for the rear lamp. It was typical to require a visibility distance of 300 feet or more for front lamps. Cities did not typically allow scooters to exceed 25 mph, as otherwise they begin to threaten both users and non-users alike. Cities also did not typically require horns/bells, GPS, or lockdown capability. While these three are not necessary, they should certainly be considered necessary by cities, as they provide great value to scooter operations in terms of safety and data.

Education

Education refers to the education of users on safe and legal operations of scooters. Education is essential to the operations of scooters, as an educated population is one that knows how to use scooters safely and legally. If users are not educated on safe and legal operations, then scooter operations were more often than not set up for failure, and, users and non-users alike are put in

considerably more danger. Components that cities typically required users to be educated on included existing city rules and regulations, safe (wearing a helmet, operating at a safe speed) and courteous riding (yielding to a pedestrian), legal parking, terms of service, privacy, penalties, and age limitations. Users are typically provided this information at the onset of purchasing a scooter ride on an interface attached to the scooter. Flyers and pamphlets were also typical means of providing education across the study sample. To properly educate users, Portland, Oregon used both public outreach events - a non-typical approach to educating users across the study sample - as well as the two typical approaches mentioned previously (The City of Portland, 2018).

Portland first required the company present a robust set of educational tools to the user at the onset of purchasing a ride. As their pilot program progressed, Portland enhanced these initial educational tools by hosting their own public outreach events in the form of safety lectures, helmet giveaways, and public meetings. Users were engaged during the pilot program and were amply educated on safe and legal usage (The City of Portland, 2018). Upon the conclusion of their pilot program, Portland analyzed the data from the usage of scooters and surveyed users; their findings showed that users viewed scooters positively, used them more than expected, and reported very little to no issues (The City of Portland, 2018). Through the robust educational tools, helmet giveaways, and extensive public meetings, Portland's program prospered. The education component, while not the only major component involved in establishing Portland's scooter program, helped the pilot program in Portland considerably (The City of Portland, 2018).

In comparison to Portland, the city of Meridian, Idaho did not have a robust education program, did not host helmet giveaways, and, no educational events were hosted (City of Meridian, Idaho, 2018). Their program failed for a list of reasons; users parked wherever they

pleased, there were complaints of non-users being impacted negatively by user negligence on scooters, and there was an ultimate dislike of scooters in the city (City of Meridian, Idaho, 2018). Should the users have been educated on usage, then perhaps, the program would have had more success.

Portland and Meridian provide two scenarios where education of users on the above components - existing city rules and regulations, safe (wearing a helmet, speeds) and courteous riding (yielding to a pedestrian), proper parking, terms of service, privacy, instructions on usage, fees and penalties, and age limitations – either helped scooter operations or hindered them. It should again be noted that education was not the complete decider of success or failure in either city, but, the alternative to not educating users on safe and legal scooter operations is a greater chance of failure and issues as seen in Meridian. Cities should seek to act as Portland did, and require robust educational tools to users, host helmet giveaways, and host robust educational events.

Communication

Communication was carried out across the study sample in the form of one, the company providing contact information for the city and users alike and two, in having around the clock availability to respond to any reported issues or questions from the city or user. This component was typical to all cities in the study sample. Having strong communication between user and company allows users the opportunity to report unsafe scooters, maintenance issues with scooters, illegally parked scooters, or to ask general questions on operations. Having strong communication between cities and the company allows transparency by the company in their operations, the city to ask questions on operations, and the city to request data at any given point. A typical aspect to this component was that the company have a fully staffed operations center,

staffed around the clock, in the city to provide efficient response to notices of violation and to customer complaints within (City of Kansas City, Missouri, 2018).

Data

Data refers to the data collected by cities on behalf of the company regarding scooter operations. Data privacy was an aspect of data in the study sample as well; protecting user data is important in preventing financial information be stolen. These data collected by over half of the cities in the study sample included usage, vehicles, users, and survey data from users. Data sharing on utilization rates is necessary when cities or companies wish to increase or decrease a scooter fleet size, rebalance scooters to a new location in the city, or change scooter functions on behalf of survey data. Data sharing on behalf of the company was required by over half of the cities in the study sample, while it was unclear if the other cities required this or not. Data types other than survey data were typically shared via an application programming interface (Denver Public Works, 2018), which simply allows two applications to communicate with each other. Survey data is typically gathered by public outreach events (The City of Portland, 2018). Table 5 below was derived to displays the different data types found in the study sample, which categories they fall into, and an example location of where this data was required to be gathered.

Table 5: Data types, category, and an example location.

Data Type	Usage	Vehicle	User	Survey	Example
Trip starts and ends	X	X	X	--	Kansas City, MO
Crashes	--	X	--	--	Kansas City, MO
Trip distance	X	X	X	--	Denver, CO
Map of route	X	X	X	--	Boise, ID
Vehicle counts	X	X	X	--	Kansas City, MO

Location of towed vehicles	--	X	--	--	Austin, TX
Number of daily, weekly, and monthly riders	X	X	X	--	Denver, CO
Demographics (age, gender)	X	--	X	--	Kansas City, MO
Low-income users number	X	--	X	--	Denver, CO
Active customers	X	--	--	--	Kansas City, MO
Injuries	X	--	--	--	Denver, CO
Device theft	--	X	--	--	Austin, TX
Vandalism and losses	--	X	--	--	Denver, CO
Parking compliance	--	X	--	--	Dallas, TX
Maintenance reports	--	X	--	--	Oakland, CA
Battery level	--	X	--	--	Providence, RI
Customer complaints	--	--	--	X	Portland, OR
Community outreach	--	--	--	X	Portland, OR

Rider surveys	--	--	--	X	Portland, OR

(City of Boise, Idaho, 2018; City of Dallas, Texas, 2018; Denver Public Works, 2018; Morabito III, 2018; Spillar, 2018; The City of Portland, 2018).

Usage data can be utilized on behalf of the city to recommend an increase in fleet size if the number of daily, monthly, or weekly riders show that rides exceed the expected level of service. Usage data can also help cities decide if scooter deployment locations should be altered or moved based upon their trip origin or destinations. User data can help show cities if scooters are being utilized enough by low-income users, by certain demographics, or are causing more injuries than expected. Vehicle data can help show cities the movement, distribution, and compliance of scooters while in operation. Vehicle data can also help to improve city traffic management. These data can help cities know if scooters are being deployed to preferred locations, if they are being vandalized, or if scooters are in need of repairs. Lastly, survey data can be used to help cities know how their constituents wish to improve scooter operations. Portland utilized survey data in more instances than other cities in the study sample. Cities should utilize all types of data to enhance their scooter operations and ensure code compliance.

Chapter 5 - Financial Requirements

Financial Requirements

The financial requirements refer to revenue sources for cities that fund scooter operations. This revenue provided cities funding to cover scooter implementation and routine functions, a means to prohibit illegal or improper activity with scooters, and protection from damages to city property. Revenue yields from these three sources are important for cities, as even though scooters are an amenity, they do use public resources, and thus a city needs the revenue to allow them to do so. Three core financial requirements were found across the study sample. The three core financial requirements were fees, fines, and bonds. These three financial requirements can generate the desired or needed revenue given any combination or amounts charged. Fees and fines were the most typical source of revenue for cities, while bonds were used by merely 20% of cities. In terms of reliability, fees and bonds are reliable, while fines are not. However, fines provide an incentive to the users and the company to prevent scooters from becoming a nuisance or violating regulations. There were a variety of other financial requirements that were not typical across the study sample, thus they will not be discussed as a viable option for cities in this chapter. The revenue that cities collected typically went to improving infrastructure to accommodate scooters, such as creating bike lanes or improving street conditions (Fischer, 2018).

Fees

Fees were a reliable source of revenue for cities across the study sample. Fees are sums that cities require companies to pay in order to have the right to operate scooters within their city. Fees are an instant and upfront way to obtain payment for scooter operations; cities can obtain a lot of revenue quickly with fees. Typically, fees were incurred upon the company in order to

begin or continue operation. They are one of two reliable revenue sources for cities (along with bonds). Fees were found in five forms in this study, as displayed in Table 6 below. Three fee structures were typical across the study sample, however, two fee structures, technology and operating in the ROW, were found in Washington D.C. It was not clear what the technology fee was incurred for, however, this is certainly an option worth exploring.

Table 6: Fee types, ranges, structures, and example locations.

Fee Type	Description	Ranges	Structure	Examples
Permit/ Application	An instant form of revenue cities receive when companies apply for a permit	$23 - $15,000 (Middle ranges included $100, $500, $808, $5,000)	One time; semi-annual in San Antonio	$100 – Atlanta, GA; $500 – Memphis, TN; $808 – Dallas, TX; $5,000 – Oklahoma City, OK
Daily/Annual	Daily or annual form of revenue based upon scooters in operation	$1	Daily fee is per scooter; annual fee is periodic	$1 - Kansas City, MO, Baltimore, MD, Indianapolis, IN, Louisville, KY
Renewal	Annual form of revenue based upon permit or agreement renewals	$100 - $404	Periodic/Annual	$100 – Fort Lauderdale, FL, Washington, D.C.; $404 – Dallas, TX
Technology	Information not available	$25	Information not available	$25 - Only seen in Washington, D.C.
Operating in ROW	Annual form of revenue for the city to cover costs of operating in the ROW	$25	One-time	$25 – Only seen in Washington, D.C.

(City of Baltimore, Maryland, 2018; City of Dallas, Texas, 2018; City of Fort Lauderdale, Florida, 2018; City of Kansas City, Missouri, 2018; City of Memphis, 2018; City of Oklahoma City, Oklahoma, 2018; City-County Council of the City of Indianapolis and of Marion County, Indiana, 2018; Government of the District of Columbia Department of Transportation, 2018).

As seen above in Table 6, fees can be incurred for various purposes at various ranges. Fees offer daily, one time, annual, and periodic structures, giving cities a range in options given when revenue is needed most. Lastly, revenue can be obtained quickly should a higher permit fee be instituted, or, if there are large numbers of scooters in operation (with daily/annual per scooter fees).

Figure 7 below was derived to show the frequency of choices for fee types across the study sample. As can be seen, permit fees were the most popular option.

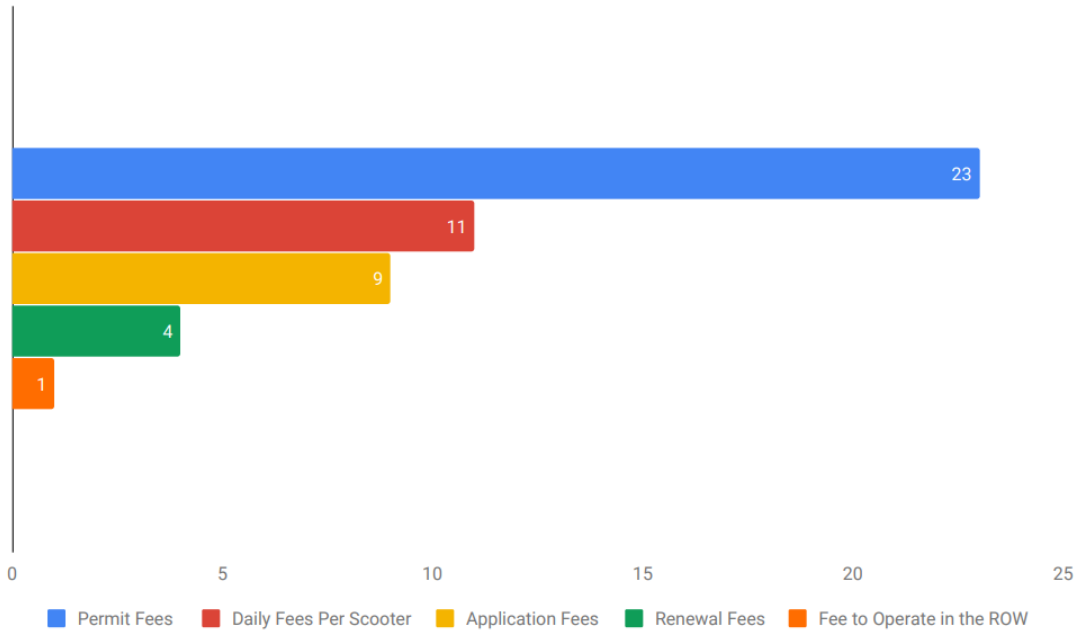

Figure 7: Frequency of choice per fees across study sample.

Figure 7 includes combinations of fees that cities used. For example, 2 cities used a daily fee and a permit fee, thus increasing the amount of revenue they received for scooter operations. Two of the most commonly utilized fees, permit and application fees, were chosen by half of cities in the study sample. If a city lacks excess funding that can be applied to scooter operations, the most common type of fees, permit and application fees, provided a quick solution. And, as there are many variables with scooter operations, the excess funds provided by permit fees can be crucial to funding operations.

One city that utilized both permit and application fees was Portland. In Portland, permit fees (set at $250 for the permit application and $5,000 for the permit itself) provided the city an instant source of revenue for scooter operations. These funds provided an upfront source of revenue to cover project startup and program administration costs for the e-scooter pilot program, as well as educational and public outreach (The City of Portland, 2018). In collecting this large source of revenue upfront, Portland was able to cover costs associated with scooter operations that otherwise would not have existed. In this instance, permit fees were the perfect solution in coming up with funds instantly; should a city not have the funding to implement scooters, like in Portland, large permit and application fees are the perfect solution.

Fees incurred per scooters in operation offer a constant source of revenue for cities (however, this source of money is dependent on the fleet size). Louisville, Kentucky took two approaches to these fees per scooters in operations: “Daily Dockless Vehicle Fees” and “Annual Per Dockless Vehicle Fees”. The daily fees (typically set at $1, as noted above) offered a daily stream of revenue per each scooter in operation, and were typically used to improve shared mobility infrastructure (Fischer, 2018). The process of acquiring fees was not clear. Louisville

established its initial fleet size as 150 scooters, thus, they received approximately $150 per day. To accrue more funding on top of the daily fees, Louisville, as mentioned above, also utilized an annual fee of $50 for every dockless vehicle in circulation. This extra set of revenue was used to remedy a variety of issues in Louisville, such as moving illegally parked vehicles, recouping the loss of public ROW space, and for purchases of new bike racks (Fischer, 2018). The extra set of fees gave Louisville another instant source of revenue.

Fees offered Portland and Louisville (Fischer, 2018; The City of Portland, 2018) an instant and often sizable amount of revenue. Low permit and application fees, as well as a smaller fleet size in Louisville, were counteracted with an annual dockless vehicle fee of $50 per scooter. A city can also incur higher fees to reduce the number of scooters in operation, thus using fees as a means of control. Ultimately, the accruement of revenue can be increased quickly with higher fees or combinations of fee types, as fees offer the promise of reliable, instant, and often, large sums of revenue.

Fines

Fines refer to a sum that a city imposes upon users and companies alike as punishment for violating scooter regulations. Fines are an unreliable revenue source; cities should not rely upon fines, however, if enough violations occur, revenue can pile up quickly for cities. The collection method for fines was unclear across the study sample. Fines are important as a punishment mechanism to keep users and companies from violating regulations. 6 different fines on various regulations being broken were found across 10% of cities across the study sample; illegal parking, parking outside operation zones, not properly rebalancing, DUI's, reckless operation, and damaging the scooter's VIN sticker. It was unclear if other cities did not have fines, however, it can certainly be inferred that these fines did exist, as these punishment

mechanisms are important in regulating scooter operations. Fines should be incurred by cities and should be high enough to both accrue revenue and control operations.

For illegal parking, parking outside operation zones, and not properly rebalancing, the company is the responsible party. For DUI's, reckless operation, and parking outside operation zones, as users are the responsible party. The highest fine imposed on companies were $500 in Louisville for parking illegally, while parking outside the operation zone was a $100 fine in Louisville. Not properly rebalancing scooters was worth $500 in Louisville (Fischer, 2018). Users were fined $1,000 for a DUI, $250 for reckless operation, and $1,000 in San Diego, California for damaging or removing a VIN sticker (City of San Diego, California, 2018). Again, fines are important as a control mechanism, and should be high enough to reflect this importance.

Bonds

Bonds, typically referred to as performance bonds, are issued by a bank or another insured financial institution and constitute a promise of repayment to the city in the event that the city needs funding for repairs, towing, storage, or removal of vehicles (SFMTA, 2018). Bonds are typically returned at the end of operations back to the company or rolled over for another year (SFMTA, 2018). 20% of cities in the study sample required performance bonds as a source of revenue for their scooter programs. Two types of performance bonds were typical in the study sample; a fixed fee or per scooter. Given that they have a range of acceptable uses, performance bonds are beneficial to cities in that they are a reliable revenue source that is readily available should scooter operations cause an issue that requires immediate funding to repair. Bonds typically must be replenished should they fall below a certain level (SFMTA, 2018); that money

will always be available to cities. However, not all cities in the study sample required they be replenished.

Table 7 below displays the variation in bonds found across the study sample. The location, the type (if it is per scooter or a fixed fee), and their acceptable use are listed below in Table 7.

Table 7: Bond types, replenishment rules, and acceptable uses.

Location	Fixed Fee	Per Scooter	Acceptable Uses
Arlington County, VA	$5,000	--	Removing and storing improperly parked vehicles
Austin, TX	--	$100	Public property repair and maintenance; auditing, storing, or removing improperly parked vehicles; costs incurred if the company is not present to fix an issue
Dallas, TX	$10,000		An irrevocable letter of credit; used to recover damages, fees, or fines, paid for by the company
Denver, CO	--	$30	Public property repair and maintenance; auditing, storing, or removing improperly parked vehicles; costs incurred if the company is not present to fix an issue
Fort Lauderdale, FL	--	$80	Information not available
Memphis, TN	--	$50	Public property repair and maintenance; auditing, storing, or removing improperly parked vehicles; costs incurred if the company is not present to fix an issue

Nashville, TN	--	$80/scooter	Public property repair and maintenance; auditing, storing, or removing improperly parked vehicles; costs incurred if the company is not present to fix an issue
Providence, RI	N/A	$50/scooter	Public property repair and maintenance
San Francisco, CA	$10,000	--	Public property repair and maintenance
Washington, D.C.	$10,000	--	Removing improperly parked or unsafe scooters

(City of Dallas, Texas, 2018; City of Fort Lauderdale, Florida, 2018; City of Memphis, 2018; City of Nashville, Tennessee, 2019; County Board of Arlington County, Virginia, 2018; Denver Public Works, 2018; Government of the District of Columbia Department of Transportation, 2018; Morabito III, 2018; SFMTA, 2018; Spillar, 2018).

The revenue generated from performance bonds can vary based on the type; a fixed fee has the potential to provide more funding should fewer scooters be allowed in the city, while a fee per scooter could accrue more revenue should the number of scooters allow so. The acceptable uses focused primarily upon public property repair and maintenance, removing improperly parked scooters, and auditing or storing scooters.

Performance bonds ultimately provided cities a large sum of money that can be relied upon to cover large expenses related to routine functions of scooters. If a city needs a large amount of funding for operations, then performance bonds are a viable and intriguing option to utilize.

Conclusion

To return to the research question, what are the components that cities should know when are seeking to regulate electric scooters, the answer is those components that fulfill legal, operational, and financial requirements. These components are revisited below in Table 8. The requirement that they fulfill, the common options for cities in regards to the components, and the major consideration when establishing these components can be seen below. Table 8 is thus a consolidation of the answer to the research question, and cities can use this table to easily understand basic information for each component. A reference page number is included in the table for cities to return to the examination of said component.

Table 8: Components, the requirement they fulfill, options for cities, major consideration, and reference page number.

Component	Legal	Operational	Financial	Options for Cities	Major Consideration	Page
Mechanism of Regulation	X	--	--	Ordinances, Pilot Programs, Agreements, Permits	Control, exploration of parameters, and time to establish	12
Definitions of Scooters	X	--	--	E-Scooter, Motorized Scooter, Dockless Vehicle, Dockless Scooter, and Electric Standup Scooter (most common)	Operation zones, state laws on scooter definitions (if applicable)	16
Liability	X	--	--	Establishing liability with "General Indemnification" and "Professional Indemnification" Agreements	Establishing liability and holding city harmless in the event of liability	17
Insurance	X	--	--	Worker's Compensation, Commercial General Liability, Business Automobile Liability, Employer's Liability, and insuring City Officials	Scooters are a considerable risk; cities should be protected as such both financially and legally	18
Fleet Regulations	--	X	--	Setting an initial fleet size, expanding the fleet size, and rebalancing	Over-concentration, over-crowding, and meeting expected levels of service	23
Parking	--	X	--	Sidewalk, Street, Against Buildings, Against Street	Preventing injuries and over-crowding or over-concentration	29

				Furniture, Designated Parking Spots, and Unmarked Curbs		
Attachment	--	X	--	Fixed or Moving Objects	Preventing scooters from becoming a public nuisance, protecting user and non-user safety	31
Equipment	--	X	--	Headlights, Horns, GPS, VIN Stickers, Motors, Brakes, Wheels, Fenders, Handlebar, Lockdown Capability, Kickstands, and Platforms	If the product is safe and functional, then the chance of serious injury is lessened, and, the operations have a greater chance to succeed and prosper into the future	32
Education	--	X	--	Educating users on existing city regulations, safe riding, parking, terms of service, privacy, penalties, and age limitations	If users are not educated on safe and legal operations, then scooter operations were more often than not set up for failure, and, users and non-users alike are put in considerably more danger	38
Communication	--	X	--	Communication between company and city, communication between user and company	Strong communication leads to transparency in operations from companies to users and cities	40
Data	--	X	--	Gathering Usage, Vehicle, User, and Survey Data	Data is necessary when making decisions to expand or decrease scooter operations	41
Fees	--	--	X	Permit/Application, Daily/Annual (per scooter), Renewal, Technology, and Operating in the ROW	Instant and upfront way to obtain payment for scooter operations	44
Fines	--	--	X	Illegal Parking, Parking Outside Operation Zone, Not Properly Rebalancing, DUI's, Reckless Operation, Damaging the Scooter's VIN Sticker	Fines act as a punishment mechanism to deter illegal operations	48
Bonds	--	--	X	Fixed Fee or Per Scooter	Large sums of money, backed by a bank or financial institution, that pay interest and constitute a promise of repayment to the	49

					city in the event that the city needs funding	

The purpose of this research was to provide cities a comprehensive guide to scooter regulation practices. However, this report could not be as extensive as desired at times, as there were instances where information and data were not available in the documents reviewed. It was often difficult to obtain the context behind why a city chose to use an ordinance as a mechanism of regulation, for example, without speaking to those who wrote said articles. While blogs or reports did provide context, many times it was impossible to find the reasoning or context behind regulations. Interviewing or discussing the ordinances with the authors would have been beneficial to this research. Lastly, the newness of scooters, and thus a lack of scholarly work on the subject made this research difficult.

This research can lead to more detailed reports on the context behind scooter regulations in the future. The field of scooters and micro-mobility will be rapidly changing in the future and will surely have more research and data in the coming years. This guide was a comprehensive look at practices, but could be enhanced by said data or by a more contextual search for the reasoning behind some practice.

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VeoRide Inc
Spencer Dickerson
Western US Regional Manager
spencer@veoride.com
(618) 803-8655
512 E 9th St.
Lawrence, KS

Request for Proposal of Contract Renegotiation

4/30/2019

OVERVIEW

A request for proposal of a renegotiation of VeoRide's contract with the City of Lawrence. The current operational guidelines laid out in the original memorandum of understanding have made it unlikely that VeoRide will continue to do business in Lawrence. The request is to amend the contract to expand the area of operations into an easy to use, open, geofence. It is also to request VeoRide scooters to be in Lawrence as well as for VeoRide to be the single vendor of micromobility for Lawrence

GOALS

1. Change the geofencing from forced parking areas to recommended parking areas.
2. To bring electric scooters to Lawrence.
3. To become the single vendor of micromobility in Lawrence.

Geofences

Under our current MOU, VeoRide has several stations that are shown on the VeoRide map and restricted as forced parking areas. I would like the forced parking area status to be removed, and the parking areas shown on the map to be replaced with recommended parking areas. This change would allow for a simpler experience for VeoRide users, and help to reduce problems that arise from GPS inconsistencies from forced parking areas. Below I describe forced parking areas, explain why they seem necessary, and also explain the real world faults associated with this system.

A forced parking area is a geofenced location in which a VeoRide vehicle can be parked, but if parked outside of, the trip will be ongoing until the vehicle is parked inside of. The reason forced parking areas seem appealing is because they theoretically eliminate the ability of a VeoRide user to park anywhere other than the desired location. This is further desired as an effort to keep vehicles out of pedestrian right of ways, and to keep access areas open in keeping with ADA compliance.

Forced parking areas become problematic because they don't necessarily help with the things they are trying to accomplish. Users are still able to lock bikes outside of forced parking areas, and may not realize that the app is still timing their ride. In this circumstance, we can create a logic tree for the events that would take place following the locking of the bike:

Step 1.) The bike is locked and the ride is ongoing for being outside of a forced parking area for longer than 45 min. We may or may not have accurate ride path information from the ride. If we don't, then we need to end the ride out at a reasonable time (10 minutes) and consider it a gps inconsistency. If we do, we can contact the user and move to step 2.
Step 2.) We reach out to the user to let them know that the bike needs to be returned to a forced parking area. We let them know that if they are unwilling or unable to return the bike, then we will charge them a $15 retrieval fee. Either the user will or won't return the bike. If the user does return the bike, they need to have the excess charge from the ongoing ride refunded. If this amount is less than $5, then it can likely just be returned to their veoride wallet. If it is greater than $5, then they need to be refunded via our payment processor which takes 5-10 business days and removes a percentage as a processing fee. We likely lose the customer due to the inconvenience. If the user does not want to return the bike, we move to step 3 to dispatch our techs to retrieve it. We likely lose the customer due to the inconvenience.
Step 3.) Techs are notified and they stop what they are doing to retrieve the bike. We can't charge a retrieval fee unless we are retrieving the bike. If we wait until the techs are in the area, someone else could take the bike and the retrieval fee would be unwarranted and possibly unlawful. This disrupts the flow of work techs are maintaining throughout the day.
The other reason forced parking areas are problematic is because of GPS inconsistencies. In order for the parking areas for have a high parking success rate, they need to be much larger than the actual parking area (bike rack). Generally, they need to be around 20-30' larger in each direction. With this kind of tolerance, the forced parking areas still allow users to park vehicles in the middle of pedestrian right of ways, or in the middle of the street. It also occasionally stops users who are parking appropriately from properly ending their rides.

If we get rid of forced parking areas and replace them with recommended parking areas then we can still encourage users to park in desired locations, but with greater ridership and user retention. Our staff will pick up any bikes outside of desired locations, but will be able to do so by more fluidly working them into day to day operations. Greater ridership and user retention also means that we are able to afford more labor hours to deal with operations. Bikes will inevitably end up in places where some community members won't want them at a higher rate than with forced parking areas, but not only do the forced parking areas not eliminate that problem, they also create operational hurdles and delays in dealing with them.

For these reasons, I propose that we eliminate the forced parking areas and replace them with recommended parking areas. I also suggest that we add every bike rack in Lawrence to the map of recommended parking areas so that users have a clear notion of where they should be parking around town. If bikes are consistently ending in specific places that don't have bike racks, this is clear data that can be shared with the city to have bike racks installed in those locations. This would increase the usability of our service and give a more clear picture of how students and community members move around Lawrence on bikes.

Scooters

I would like to request that the City of Lawrence allow electric scooters to be used in Lawrence under the same ordinances as bicycles. I would also like to propose for the sake of safety that any scooters that are brought to Lawrence should have the following specifications:

1.) Dual mechanical drum brakes (front and rear)
2.) Dual suspension (front and rear)
3.) Vacuum tire
4.) Field swappable battery
5.) Integrated lighting system for front, rear, and underdeck
6.) 4G LTE connection; 8-350W rear motors
7.) Required field test

The final request for scooters is that they need to be available to students and residents twenty-four hours per day, and seven days per week.

Single Vendor

I would like to request that the City of Lawrence accept VeoRide as an exclusive vendor for micromobility. While competition is largely a great thing for consumers, in this industry it confers no difference in pricing or services when multiple companies are in the same market. Instead, there are simply more units than with a single vendor and both companies hurt each other's revenue. Most of our competitors refrain from hiring local teams, but instead rely on "juicers." Juicers will pick up scooters at night and charge them before replacing them in the morning. We don't hire juicers. Instead, we have a local team that rebalances, fixes, charges, and checks the fleet on a daily basis. In our case, multiple vendor would eat at our potential revenue and give us fewer resources to pay our techs. In this case, we would need to limit out daily operations to match our revenue. It is for these reasons that VeoRide should be the single micromobility vendor for the City of Lawrence.

David Cronin

From: David Cronin
Sent: Wednesday, February 20, 2019 9:12 AM
To: lukesmith168@gmail.com
Cc: Maria Garcia; Melinda Harger; Gregory Burns; Brandon McGuire; Charles Soules; Amanda Sahin; Multi-Modal Transportation Team
Subject: RE: Opting out of Standard Traffic Ordinance Sec. 109.1

Mr. Smith,
I'll discuss your request with our city staff multi-modal transportation team and I would also encourage you make a request during public comment at an upcoming Transportation Commission meeting. The next meeting is Monday March 4 @6p in City Hall. Thanks.

https://lawrenceks.org/boards/transportation-commission/

David P. Cronin, P.E., *City Engineer*
Municipal Services & Operations | City of Lawrence, KS
PO Box 708, Lawrence, KS 66044
office: (785) 832-3130 | fax: (785) 832-3398

From: Brandon McGuire <bmcguire@lawrenceks.org>
Sent: Tuesday, February 12, 2019 2:34 PM
To: David Cronin <dcronin@lawrenceks.org>; Charles Soules <csoules@lawrenceks.org>; Amanda Sahin <asahin@lawrenceks.org>; lukesmith168@gmail.com
Cc: Maria Garcia <mgarcia@lawrenceks.org>; Melinda Harger <mharger@lawrenceks.org>; Gregory Burns <gburns@lkpd.org>
Subject: FW: Opting out of Standard Traffic Ordinance Sec. 109.1

Mr. Smith – Thanks for the email. Municipal Services & Operations department staff are copied on this email for a response.

MSO staff: Please see Mr. Smith's request below regarding STO 109.1 related to motorized skateboards and advise of an appropriate process or opportunity to seek an amendment of the STO. This may mean simply making a request during public comment at an upcoming Transportation Commission meeting.

City of Lawrence
Brandon McGuire, *Assistant to the City Manager* – BMcGuire@LawrenceKS.org
City Manager's Office | www.LawrenceKS.org
P.O. Box 708, Lawrence, KS 66044
office (785) 832-3466 | cell (785) 760-4190 | fax (785) 832-3405

From: Tom Markus <tmarkus@lawrenceks.org>
Sent: Tuesday, February 12, 2019 11:54 AM
To: Brandon McGuire <bmcguire@lawrenceks.org>
Subject: FW: Opting out of Standard Traffic Ordinance Sec. 109.1

From: Luke Smith <lukesmith168@gmail.com>
Sent: Tuesday, February 12, 2019 10:59 AM
To: Tom Markus <tmarkus@lawrenceks.org>
Subject: Opting out of Standard Traffic Ordinance Sec. 109.1

Hello Mr. Markus!

My name is Luke Smith and I am currently a student at the University of Kansas and there's nothing I love more than being able to get around efficiently. Although I personally have opted to use an electric skateboard or eboard for short. These eboards are made by multiple brands but the most prominent is Boosted Boards, I personally own a board from them. These boards are NOT made as toys or even advertised as such, they are far from it. These boards are manufactured as vehicles for everyday commutes with strong industrial grade materials. This is because many people in cities all around the United States use eboards instead of a car or bike. Cities such as Los Angeles, Chicago, San Francisco and New York City have all adopted legislation legalizing eboards and treating them same as bikes essentially. The whole states of Texas and Florida have both legalized eboards for their roadways as well.

When you look at the logistics, eboards are not different from bikes yet we allow bikes much more freedom on the roads. Eboards go up to 20mph, can go up 20% grade hills and are equipped with extremely precise brakes for split second situations. Individuals riding eboards are able to hand signal just the same as bikers are, there are no differences between the two besides what the devices are conceptually. This all is what confuses me when I look at Lawrences Traffic ordinance Sec. 109.1 which states "It shall be unlawful for any person to operate a motorized skateboard on any street, road or highway in this city". Eboads are essentially outlaws in the city of Lawrence but I see no reason for this as Lawrence is already riddled with bikes everywhere. Not to mention that cities on much larger scales have adopted eboards despite their denser concentration of traffic and people. I propose that Lawrence opt out of the Sec. 109.1 of the STO which prohibits the use of eboards, which are no different from bikes. This would have no effect on human push powered skateboards laws as their is already separate legislation regrading them in Lawrence. I only seek to change the law which prevents me from getting to my classes effectively and enjoying the roads as bikes in Lawrence do on my board.

All in all, I would love if my proposal could be distributed to all of the city commissioners of Lawrence. I would also have no issue with meeting with any of the commissioners or anyone for that matter to discuss and explain the case I'm making if need be. If you have any questions for me regarding this matter I would love to answer them! Thank you so much for your time and have a great day!

Janice Wallace

From: David Cronin
Sent: Monday, August 05, 2019 10:36 AM
To: Janice Wallace
Subject: FW: Transportation Commission correspondence

Janice, can you please attach correspondence below to agenda, thanks.

David P. Cronin, P.E., City Engineer
Municipal Services & Operations | City of Lawrence, KS PO Box 708, Lawrence, KS 66044
office: (785) 832-3130 | fax: (785) 832-3398

-----Original Message-----
From: Jeff Long <jeffreylong@gmail.com>
Sent: Wednesday, July 31, 2019 11:35 AM
To: David Cronin <dcronin@lawrenceks.org>
Subject: Re: Transportation Commission correspondence

Thanks David,

I understand that on August 5 the TC is supposed to receive a request from VeoRide to expand their program and loosen their parking requirements.

As an employee at KU I have seen the complete lack of respect VeoRide has with regard to existing parking rules. I have seen numerous bikes left in completely unacceptable locations and they have remained in those locations for extended periods of times. So any claims they may make regarding how they pick up bikes located in undesirable locations is complete bull. I highly suggest that the city not expand any existing relationship with VeoRide or loosen any requirements until they show they can respect the rest of us.

Jeff Long

On 7/25/19 8:32 AM, David Cronin wrote:
> Jeff,
> I am able to relay correspondence, let me know, thanks.
>
> David P. Cronin, P.E., City Engineer
> Municipal Services & Operations | City of Lawrence, KS PO Box 708,
> Lawrence, KS 66044
> office: (785) 832-3130 | fax: (785) 832-3398
>
> -----Original Message-----
> From: Jeff Long <jeffreylong@gmail.com>
> Sent: Wednesday, July 24, 2019 5:52 PM
> To: David Cronin <dcronin@lawrenceks.org>
> Subject: Transportation Commission correspondence

>
> Hi David,
> Are you able to relay correspondence to the Transportation Commission?
>
> Thanks,
>
> Jeff Long
>

City of Lawrence
Transportation Commission
July 1, 2019 Minutes

MEMBERS PRESENT:	Charlie Bryan, Steve Evans, Kathryn Schartz, Ron May, John Ziegelmeyer, Carol Bowen, Nick Kuzmyak, Erin Paden
MEMBERS ABSENT:	Donna Hultine
STAFF PRESENT:	David Cronin, MSO Department Charles Soules, MSO Department Jessica Mortinger, Planning Department (SS) Dustin Smith, MSO Department (SS) Jacob Baldwin, MSO Department (SS)

A complete video recording of the meeting is available on the City's website at https://lawrenceks.org/boards/transportation-commission/

STUDY SESSION

- Non-motorized Project Prioritization Update
    - Current Policy: Non-motorized Projects Prioritization Policy: TC18-001
    - Use of Policy:
        - Agenda Item for Transportation Commission 4/2/2018: 2017/2018 Pedestrian/Bike/Ramp Projects and 2017/2018 CDBG Projects
        - Pedestrian & Bicycle Project Lists/Rankings
    - Correspondence on Policy

REGULAR MEETING

The meeting was called to order by Commissioner Evans at 6:10 p.m. in the City Commission Room, City Hall, 6 E. 6th Street.

ITEM NO. 1:

Approve Regular Meeting minutes for June 3, 2019

Moved by Commissioner Bryan to approve the minutes, seconded by Commissioner Schwartz. Commissioner May and Commissioner Paden abstained. Motion passed 6-0.

ITEM NO. 2:

General Public Comment

Public Discussion: Michael Almon

ITEM NO. 3:

Staff Items

- David Cronin discussed the 3-year plan for E. 19th St. Project:
  - Design – 2019
  - Waterline construction – 2020
  - Streets - 2021.

ITEM NO. 4:

Commission Items

- Commissioner Kuzmyak provided an update on PTAC and transfer at Bob Billings Parkway and Crestline.
- Commissioner Ziegelmeyer provided an update on E. 23rd Street Corridor Study

ITEM NO. 5:

Calendar

- Next meeting August 5, 2019
  - Commissioner Bryan asked about receiving an update from the Transit Director.

ITEM NO. 6:

Adjournment

Meeting was adjourned at 6:35 pm.

Transportation Commission Study Session
July 1, 2019

Name	Initials
Members	
Charlie Bryan Lawrence DGCO Health Dept. Representative	CWB
Donna Hultine University of Kansas	
Kathryn Schartz Multi-Modal Transportation / Planning Eng Rep	KS
Nick Kuzmyak PTAC representative	NSK
Carol Bowen Pedestrian Representative	CB
Steve Evans Planning/Engineering Field Representative	SE
Erin Paden Bicyclist Representative	EP
John Ziegelmeyer Local Business Representative	
Ron May USD-497	
City Staff	
David Cronin City Engineer	DC
Jessica Mortinger Senior Transportation Planner	JM
Ashley Myers Transportation Planner	
Charles Soules Assistant Director, MSO	
Dustin Smith Sr. Project Engineer	DS
Jacob Baldwin Sr. Project Engineer	JB

Transportation Commission Study Session
July 1, 2019
Public Sign In Sheet

Name	Contact Info
Gary Webb	(ph) 9 (e-mail)
Tresa Hill	(ph) (e-mail)
Michael Almon	(ph) 1311 Prairie (e-mail)
Charles Jacobson	(ph) (e-mail) 1717 East 25th Terr
Michael L. Thompson	(ph) 1725 E. 25 Terr. (e-mail)
	(ph) (e-mail)
	(ph) (e-mail)
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Transportation Commission Meeting
July 1, 2019

Name	Initials
Members	
Charlie Bryan Lawrence DGCO Health Dept. Representative	CWB
Donna Hultine University of Kansas	
Kathryn Schartz Multi-Modal Transportation / Planning Eng Rep	KSS
Nick Kuzmyak PTAC representative	NSK
Carol Bowen Pedestrian Representative	C B
Steve Evans Planning/Engineering Field Representative	SEE
Erin Paden Bicyclist Representative	EP
John Ziegelmeyer Local Business Representative	
Ron May USD-497	
City Staff	
David Cronin City Engineer	DC
Jessica Mortinger Senior Transportation Planner	
Ashley Myers Transportation Planner	
Charles Soules Assistant Director, MSO	CS
Dustin Smith Sr. Project Engineer	
Jacob Baldwin Sr. Project Engineer	

BY-LAWS OF THE LAWRENCE MULTI-MODAL TRANSPORTATION COMMISSION
LAWRENCE, KANSAS

ARTICLE I
Name and Membership

Section 1.1 Name. The name of this organization, established by Resolution No. 7295 by the Governing Body of the City of Lawrence, Kansas shall be the Lawrence Multi-Modal Transportation Commission.

The term "Commission" in the following sections shall mean the Lawrence Multi-Modal Transportation Commission. The term "Governing Body" shall mean the Lawrence City Commission of Lawrence, Kansas.

Section 1.2 Membership. Membership of the Commission shall be as established by the above cited resolution which specifies the number, method of appointment, and term of office of the Commissioners.

ARTICLE II
Authority and Purpose

Section 2.1 Authority. The function, powers, and duties of the Commission are as authorized by the resolution establishing the Commission. Actions of the Commission are in the nature of recommendations only and are subject to approval by the Governing Body. The Commission, however, adopts its own rules and policies for procedure, consistent with its powers.

Section 2.2 Commission Purpose. Through this Commission, the Governing Body is encouraging strong multi-modal transportation planning in order to advance the health, safety, and welfare of all residents of the City of Lawrence. Commission activities include but are not limited to:

a) Making recommendations to the Governing Body regarding implementation of its Complete Streets policy;
b) Making recommendations to the Governing Body regarding the priority, location, and design of transportation facilities;
c) Making recommendations to the Governing Body regarding the expenditure of capital funds for transportation-related projects and programs;
d) Making recommendations to the Governing Body regarding expenditures of funds for the repair and maintenance of transportation projects and programs;

City of Lawrence

LAWRENCE - DOUGLAS COUNTY
MPO
METROPOLITAN PLANNING ORGANIZATION

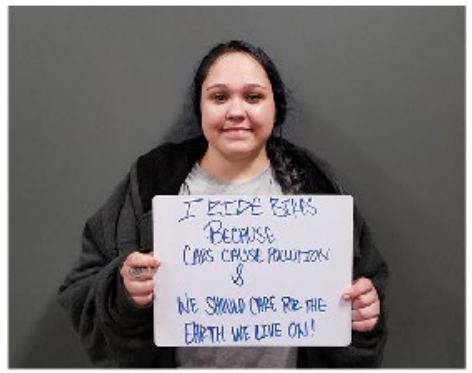
Bicycle Friendly Community
LAWRENCE, KS
BRONZE

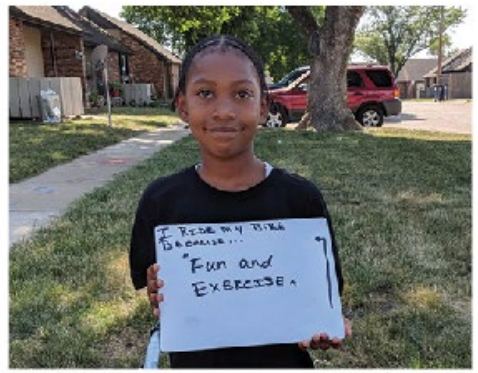
https://lawrenceks.org/mpo/bicycle_planning

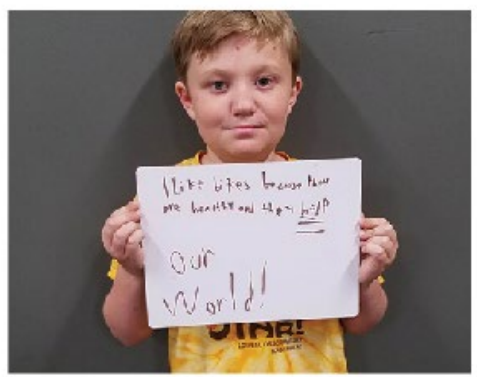
Why update the plan?

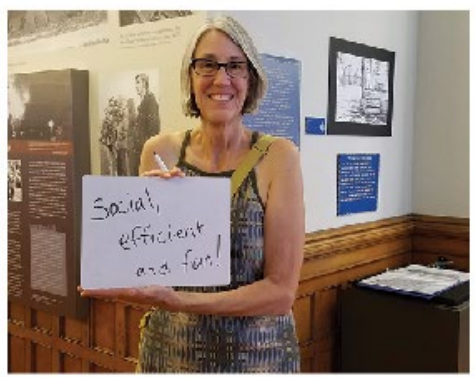
- The need to reconcile the various bicycle related plans into one vision
- Plan for a continuous low stress bikeway network
- Establish criteria for bikeway types based on best practices and national design standards
- Lay out a 5E's approach to implementation (Engineering, Education, Encouragement, Enforcement, Evaluation)
- Establish performance measures

The Case for Bicycling



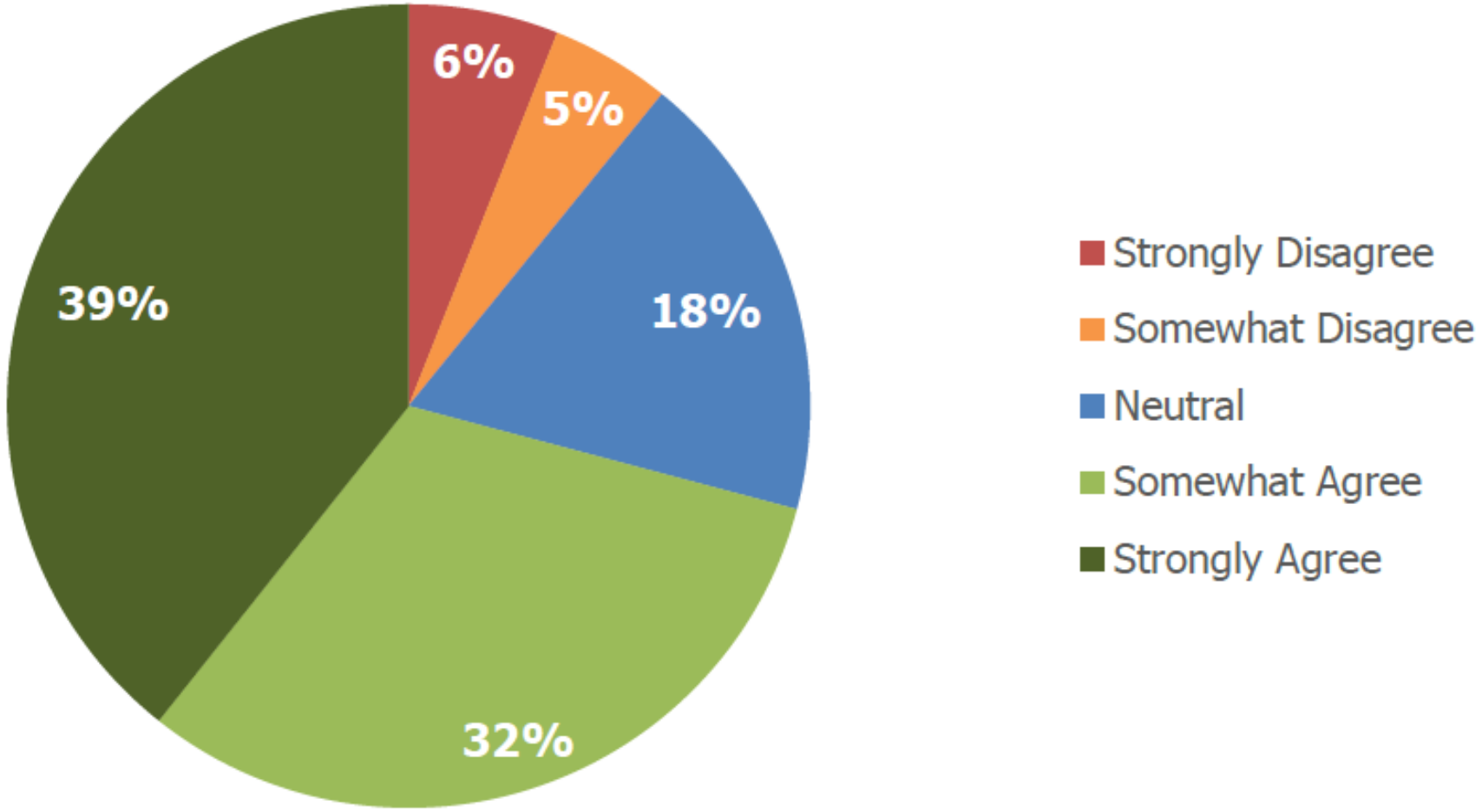






Public Input: What We Heard

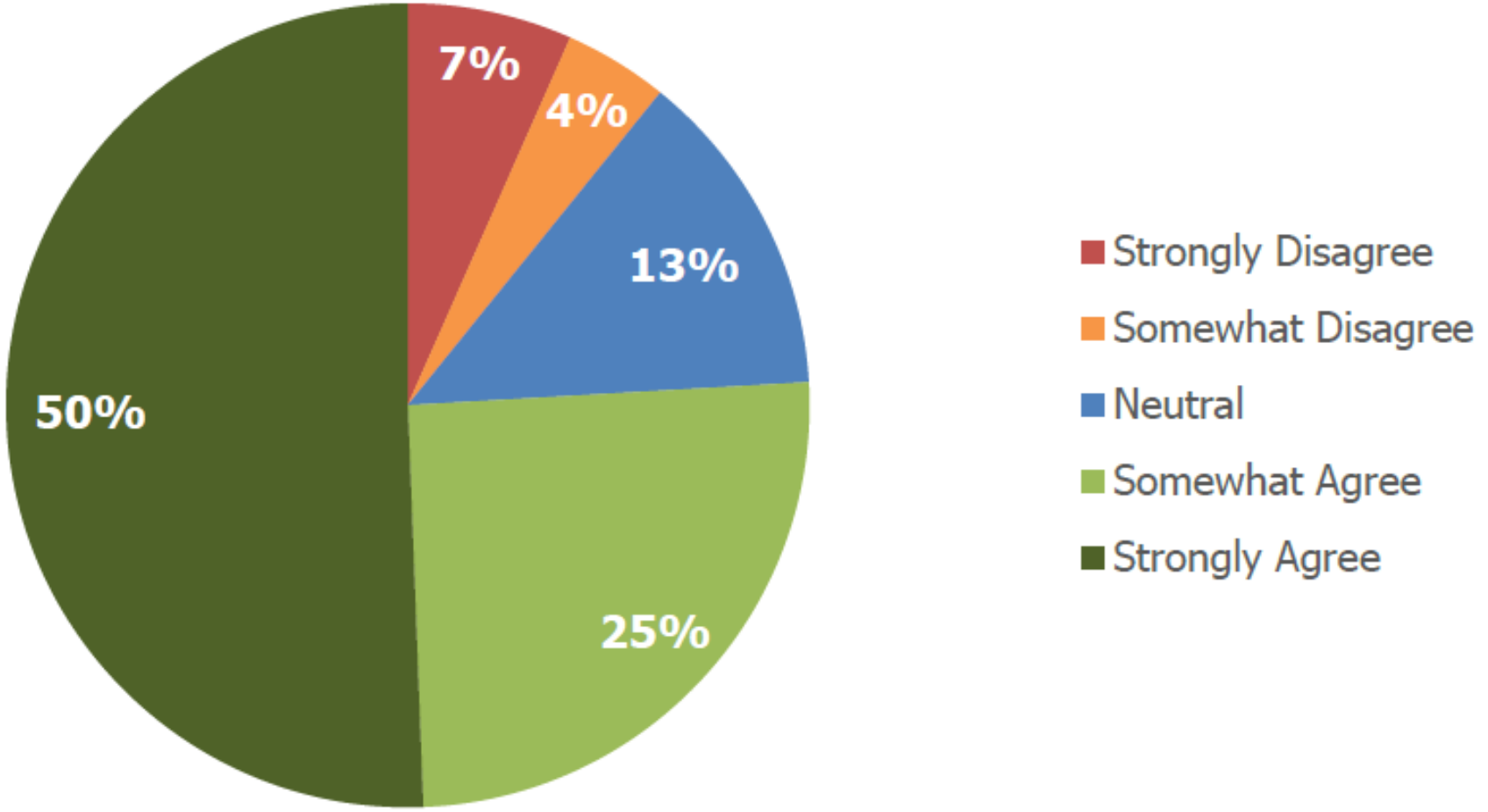
I would ride my bicycle more often if I felt I could do it safely



Number of Responses - 580

Public Input: What We Heard

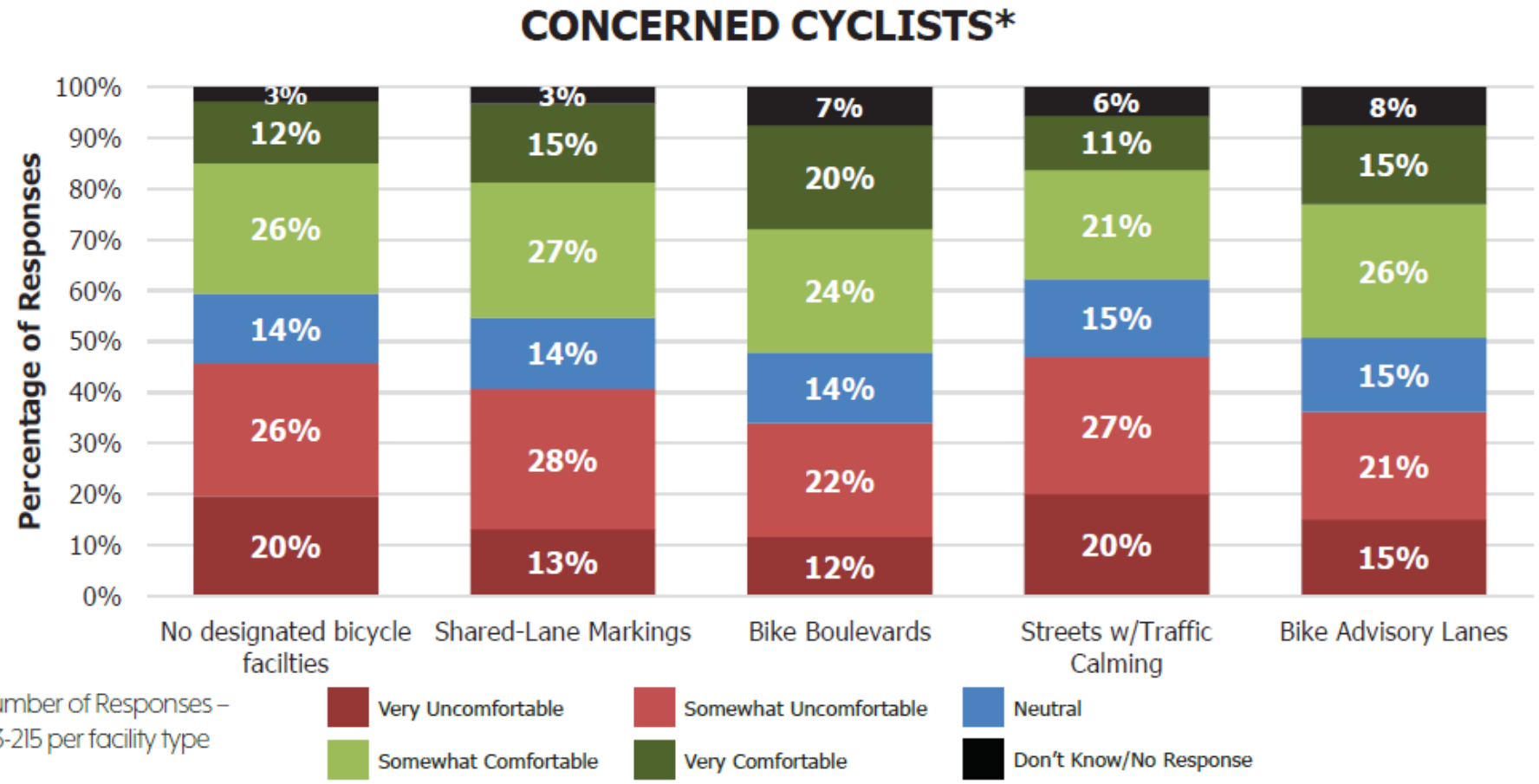
Lawrence & Douglas County's transportation network should equally prioritize the needs of people who bicycle with other travel modes



Number of Responses - 573

Public Input: What We Heard

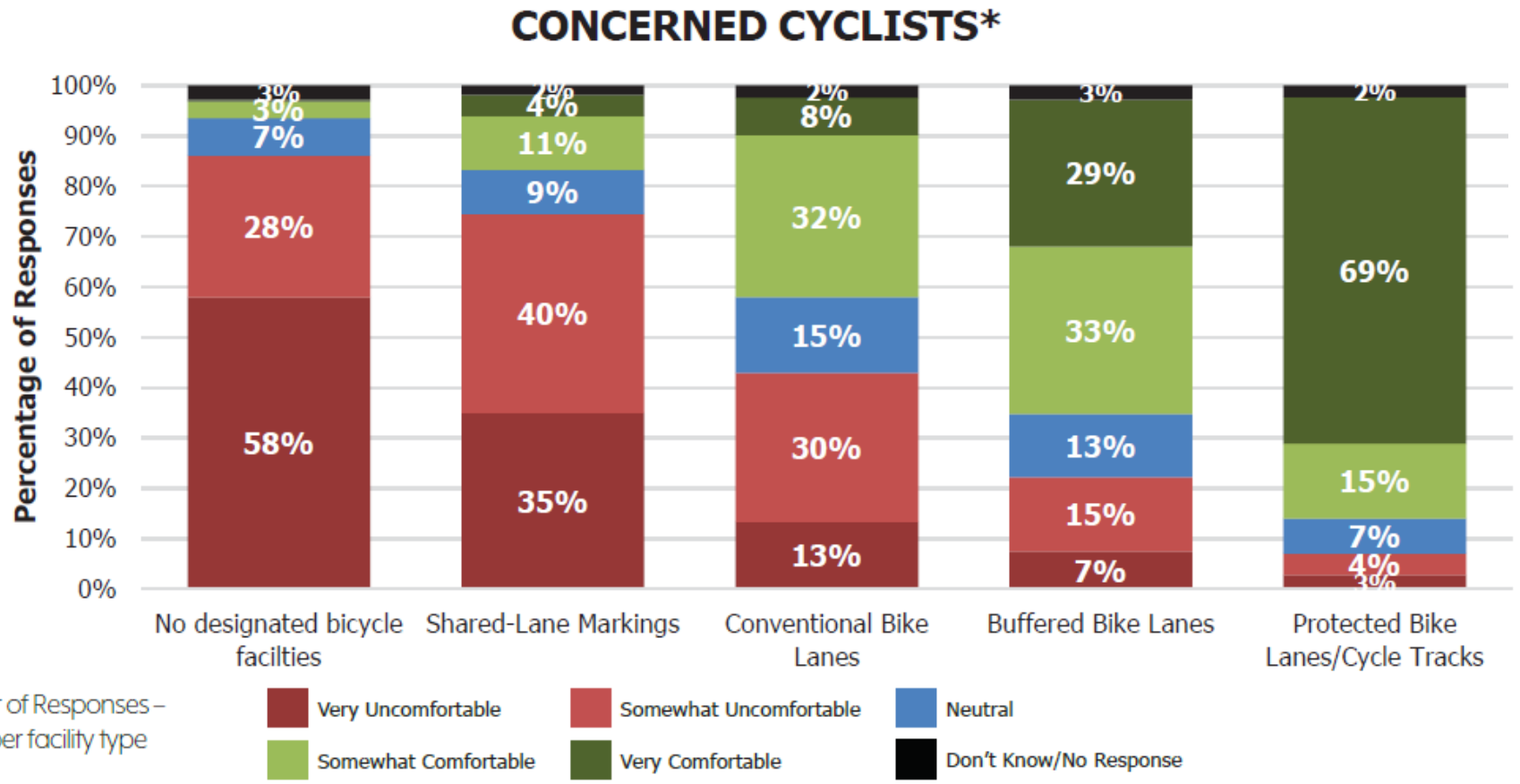
Comfort Bicycling On Different Forms of Bicycle Facilities on Residential/ Neighborhood Streets

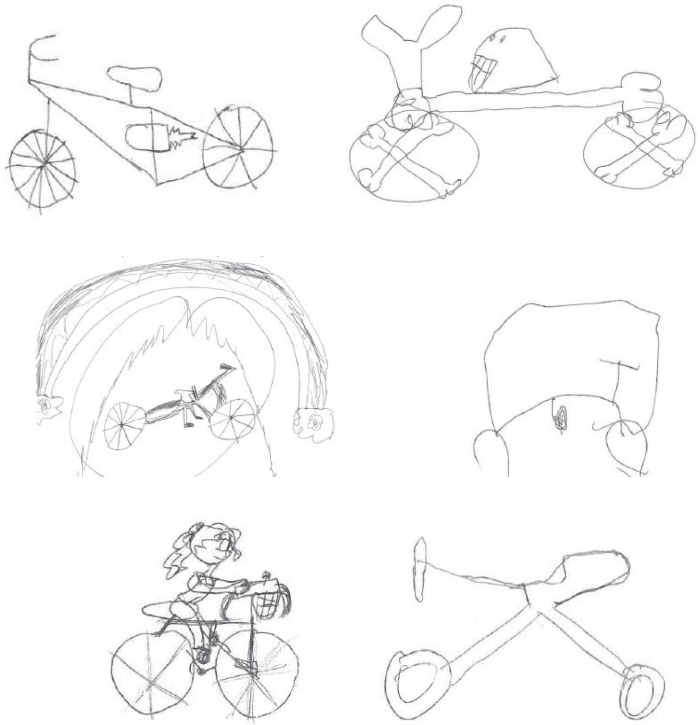


* Concerned Cyclists self-identify as bicycling only on separated shared use paths, and would like to bike more if streets or facilities were more comfortable/safer, or are not comfortable bicycling, but would like to bicycle.

Public Input: What We Heard

Comfort Bicycling On Different Forms of Bicycle Facilities on Commercial Streets





* Concerned Cyclists self-identify as bicycling only on separated shared use paths, and would like to bike more if streets or facilities were more comfortable/safer, or are not comfortable bicycling, but would like to bicycle.

Vision & Goals

Improve Safety **0 as of 2017 data**

- Continue zero bicycle riders fatalities & serious injuries through 2025.

Increase Ridership

- Increase bicycle mode choice to 3% by 2025. **1% with ±0.4 Margin of Error in 2017**
- Increase Bike to School percentage to 5% by 2025. **3% in Fall 2018**

Increase Access **79% as of July 2019**

- Increase the percentage of population within ¼ mile of Level of Comfort 3 or below bikeway network to 89% by 2025.

Create a Network of Low-Stress Bikeways **42% as of July 2019**

- Increase the mileage of low-stress bikeways to 46% by 2025.

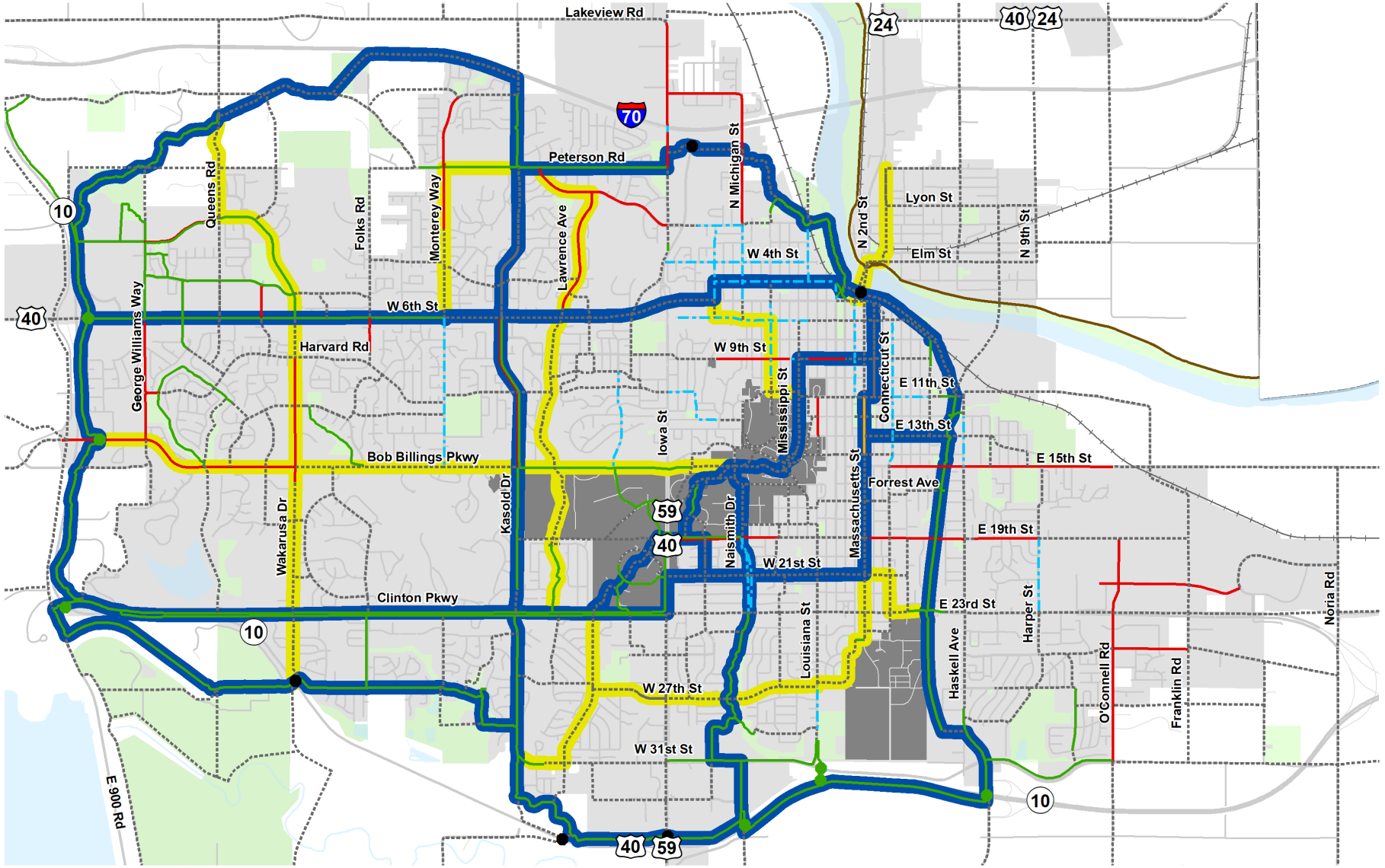
Bicycle Friendliness **Bronze level since 2004**

- Achieve League of American Bicyclists Silver level Bicycle Friendly Community or higher by 2025

Action Plan

	Recommendation	Champion	Municipal Partners	Other Partners
Education and Encouragement	Continue and expand the Lawrence Safe Routes to School (SRTS) programs	Safe Routes to School Team		
	Develop a bicycle friendly driver education program to be incorporated into driver training.	Parks & Recreation	Metropolitan Planning Organization, Health Department	USD 497
	Produce and maintain a Rideability Map.	Metropolitan Planning Organization	Municipal Services & Operations, City Manager's Office	MPO BAC
	Support programs, like the Bicycle Friendly Businesses, bicycle cooperative, bike share, community bike events, and weekly club rides, which increase access to bicycles, provides education about proper riding behaviors, and promotes a bicycling culture.	Parks & Recreation	Municipal Services & Operations, Metropolitan Planning Organization	MPO BAC, Lawrence Central Rotary, Lawrence Bike Club, Lawrence Mountain Bike Club, Lawrence Unchained
Engineering and Enforcement Operations	Establish data driven processes to support decision-making including asset management, conducting multimodal counts (active users and parked bikes), Bikeway Level of Comfort model, and crash report analysis.	Municipal Services & Operations	Metropolitan Planning Organization, Parks & Recreation, GIS	Transportation Commission
	Continue to plan and budget to incorporate bikeway maintenance into City operations.	Municipal Services & Operations, Parks & Recreation		Transportation Commission
	Enforce the rules of the road for bicycle riders and drivers to improve the safety for all road users.	Police	Municipal Services & Operations	
	Modify development code to support bicycle friendly end-of-trip amenities and bike parking. Apply regulations to retrofit existing developments.	Planning & Development Services	Metropolitan Planning Organization, Municipal Services & Operations	Developers
Evaluation	Collect SRTS travel tally and bicycle/pedestrian counts.	Metropolitan Planning Organization, Health Department	Municipal Services & Operations	USD 497, Volunteers
	Coordinate with the Neighborhood Traffic Management Program (NTMP). Track bicycle safety issues as it relates to the program.	Municipal Services & Operations	Metropolitan Planning Organization	Transportation Commission
	Track plan performance through annual performance measures.	Metropolitan Planning Organization	Municipal Services & Operations, Health Department	
	Apply to national 3rd party organizations to evaluate bicycle progress.	Municipal Services & Operations & Sustainability	Metropolitan Planning Organization, GIS, Parks & Recreation	Transportation Commission, MPO BAC

Existing & Planned Network



N

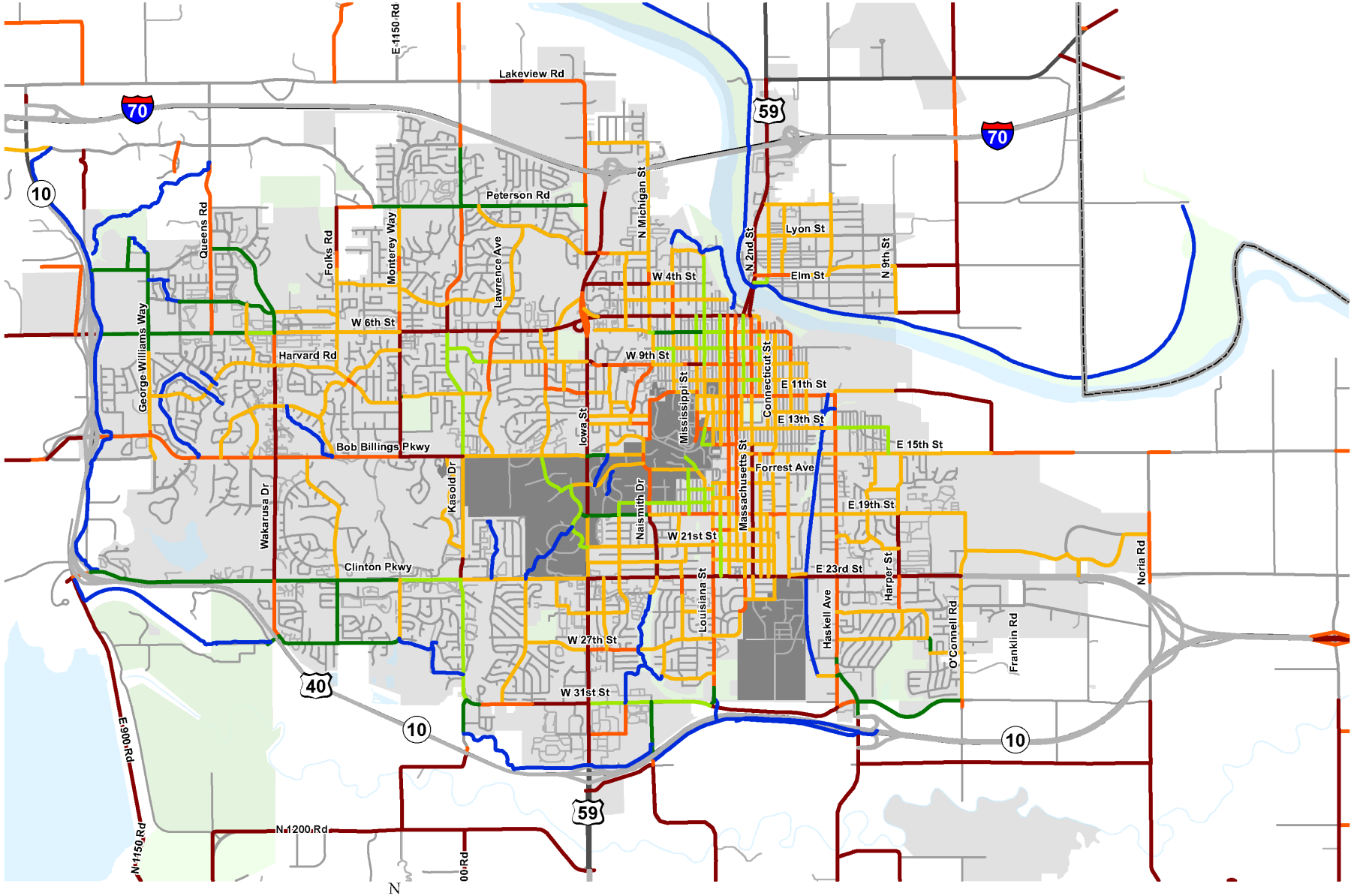
0 0.5 1 Miles

Existing bikeways may need to be upgraded to a higher comfort bikeway depending on Level of Comfort ratings. Every roadway project should assess Level of Comfort when selecting a bikeway.

- Bike Lane
- Buffered Bike Lane
- Shared Use Path
- Unpaved Trail
- Marked Shared Lane
- Future Bikeway
- Grade Separated Crossing: Existing, Future
- City Limits
- Parks
- Water Bodies
- University
- Priority Funding Network
- Secondary Funding Network

Produced: Lawrence-Douglas County MPO (2019)

Level of Comfort



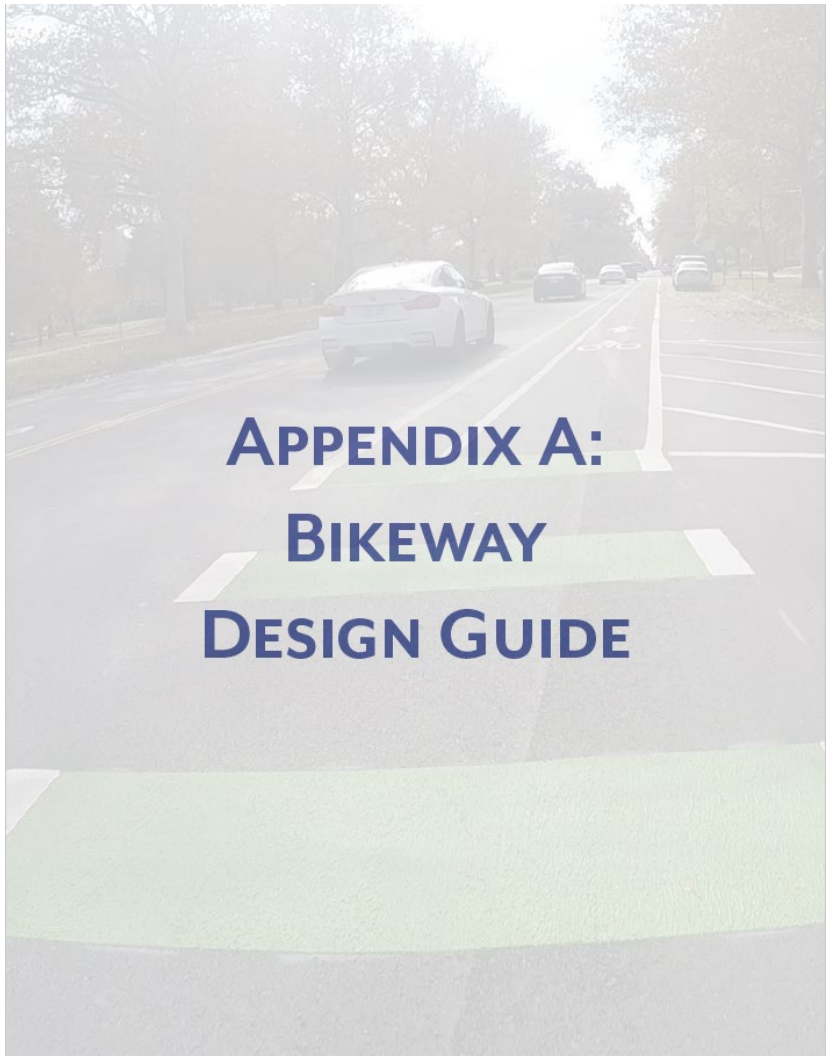
The LOC map is an evolving model based on existing roadway conditions. Changes in speed or traffic volumes can impact LOC. For the most up-to-date model visit the interactive online map.

DISCLAIMER NOTICE
The map is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the requester. The City of Lawrence makes no warranties, express or implied, as to the use of the map. There are no implied warranties of merchantability or fitness for a particular purpose. The requester acknowledges and accepts the limitations of the map, including the fact that the map is dynamic and is in a constant state of maintenance, correction and update.

Produced: Lawrence-Douglas County MPO (2019) ** LOC is based on posted speed, daily vehicle traffic volume, and existing bike facilities. More information can be found in Appendix C.*

Design Guide

The purpose of this guide is to provide a toolbox of available bicycle related facility and treatment options. The guide is not a standard or mandate superseding City of Lawrence design criteria, rather this guide provides a supplement to the Lawrence Bike Plan in an effort to create a more bikeable city. The application of bike guide elements are by a public process and engineering study.



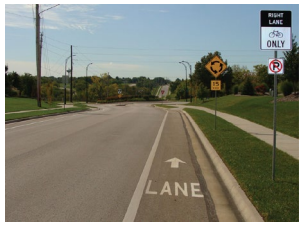
Design Guide

Marked Shared Lanes

Advisory Bike Lanes

Shoulder Bikeway

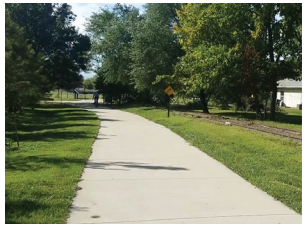
Bicycle Boulevard



Conventional Bike Lane

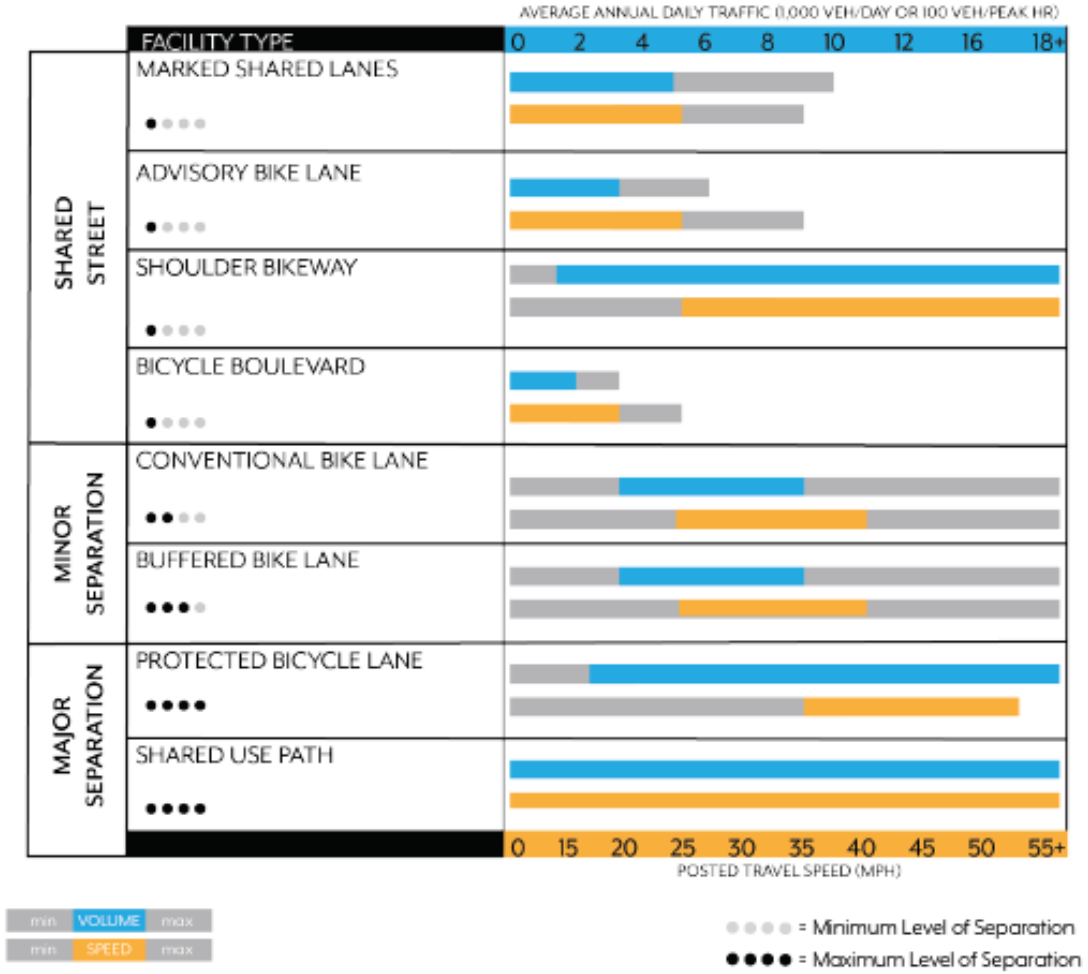
Buffered Bike Lane

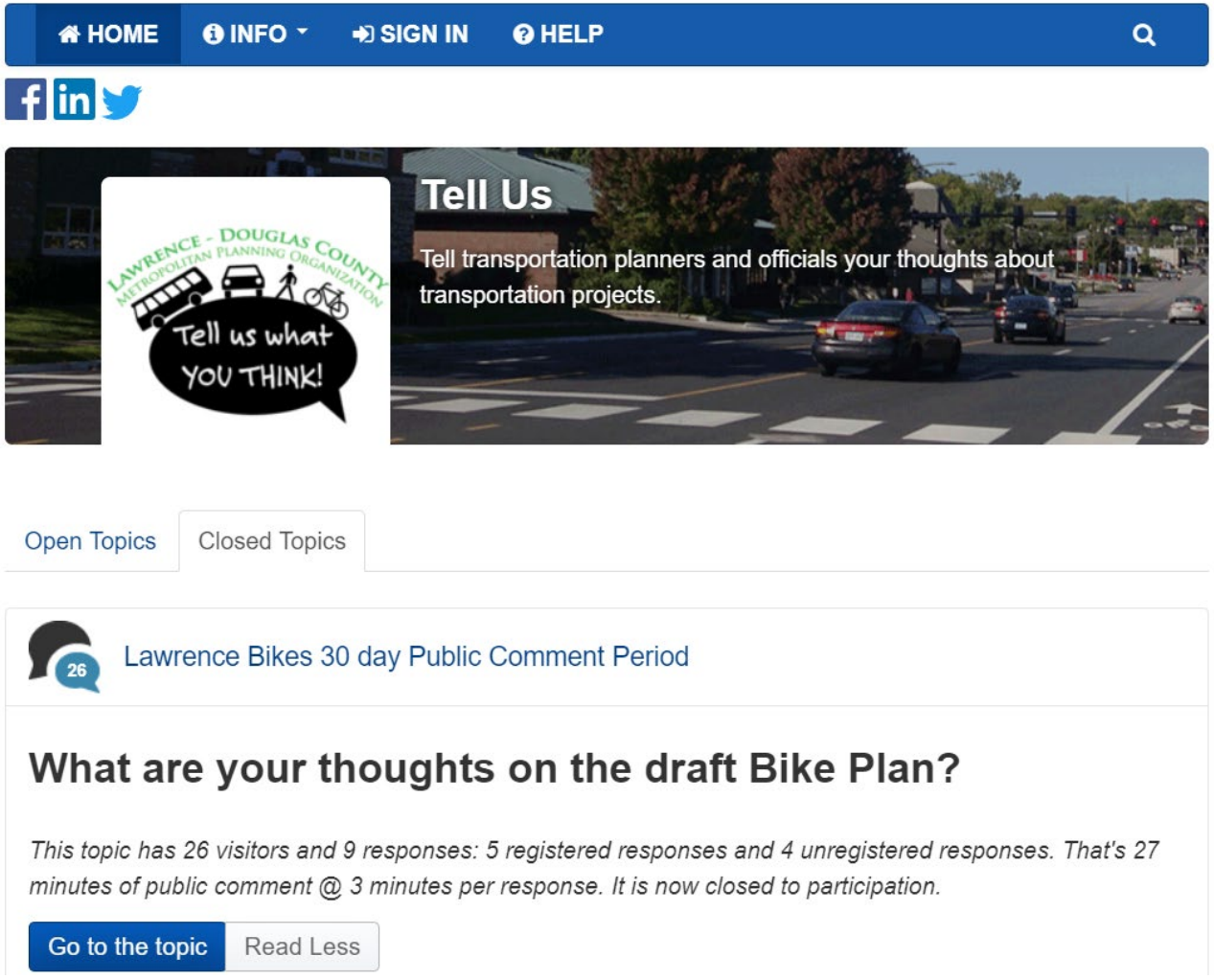
Protected Bicycle Lane



Shared Use Path

Facility Selection Criteria





Public Comment Period

Public Comment Period: May 15 to June 14

25 comments by 14 people/organizations

http://assets.lawrenceks.org/assets/mpo/bicycle/BikePlan-Draft.pdf

https://lawrenceks.org/mpo/bicycle_planning

Next Steps

Memorandum
City of Lawrence
Municipal Services & Operations

TO: Transportation Commission
CC: David Cronin, City Engineer
FROM: Jessica Mortinger, Transportation Planning Manager
Jacob Baldwin, Project Engineer
DATE: July 29, 2019
RE: Non-Motorized Prioritization Policy Update

Background

In December 2017, the Transportation Commission recommended approval of the Policy TC18-001: Non-motorized Projects Prioritization Policy. The non-motorized prioritization policy provides a basis for ranking and recommending projects for standalone bicycle and pedestrian funding. The Transportation Commission used the policy at their April 2, 2018 meeting to prioritize and make recommendations regarding bicycle and pedestrian project selection to the City Commission. The Transportation Commission and staff identified the need to update the Policy pending the outcome of the Bikeway Plan update, feedback received from the public and changes to city processes. In July 2019, the Transportation Commission provided feedback to staff at their study session on the Policy update.

Summary

The revised policy attempts to address the evolution of planning, citizen and commissioner issues and internal city process changes. The major changes are summarized below:

1. The proposed policy removes ADA Ramp Prioritization Criteria from the policy. The ADA ramp budget line item has been separated from ped /bike funding and will be a separately managed program.
2. Pedestrian Criteria Changes
    a. Priority networks have changed points, to giver higher points to projects without sidewalks on one side of the street for all categories
    b. Pedestrian Access has changed to assign cumulative points to each destination within range. (A map showing the current and proposed heat maps are attached.)
    c. Safety Roadway Volumes and Crossings has lowered the AADT and stratified across points.
3. Bikeway Criteria Changes
    a. Priority networks have been changed to recognize planned networks in the Lawrence Bikes Plan
    b. Bikeway Demand has added community service centers/parks and assigned priority points to bikeway by type to align with the new Bikeway

Demand Model from the Lawrence Bikes Plan. (A map showing the current and proposed heat maps are attached.)

c. Safety Roadway Volumes and Crossings has lowered the AADT and stratified across points.

4. Non-exclusive factors was amended to include cultural, social and economic benefit

Action Requested

The Transportation Commission should recall TC18-001 and replace with TC19-001.

Attachments

- Current Policy: City of Lawrence Transportation Commission Non-motorized Projects Prioritization Policy, Policy No. TC18-001
- Agenda Item for Transportation Commission 4/2/2018: 2017/2018 Pedestrian/Bike/Ramp Projects and 2017/2018 CDBG Projects
- Proposed Updated Policy: City of Lawrence Transportation Commission Non-motorized Projects Prioritization Policy, Policy No. TC19-001
- Pedestrian Access Maps – Existing & Proposed
- Bikeway Demand Maps – Existing & Proposed
- Correspondence on Policy

City of Lawrence, Kansas
Transportation Commission
Non-motorized Projects Prioritization Policy

SUBJECT Non-motorized Projects Prioritization Policy		**APPLIES TO** Infrastructure	
EFFECTIVE DATE	**REVISED DATE**	**NEXT REVIEW DATE** TBD	
APPROVED BY		**TOTAL PAGES** 6	**POLICY NO.** TC19-001

1.0 Purpose

In order to improve the built environment for people who walk, bicycle, or wheel, this policy implements recommendations of the Regional Pedestrian Plan, the Lawrence Bikes Plan and establishes a data-driven ranking procedure for prioritizing non-motorized projects and identifying those that confer the greatest benefit to the community.

2.0 Scope

This policy applies to all non-motorized projects, including but not limited to the following: ADA curb ramps, sidewalks, curb extensions, shared-use paths, bike lanes, protected bike lanes, bicycle boulevards, signage, crossing improvements, and other projects that improve the built environment for people who walk, bicycle or wheel. This policy does not apply to non-motorized aspects of larger roadway projects that are not funded with pedestrian and bicycle funds (although such non-motorized projects may be ranked), standalone ADA curb ramp projects or to sidewalk maintenance, which is the responsibility of abutting landowners.

3.0 Development of Project Lists

3.1 Non-motorized projects will be sorted into two lists: pedestrian gaps/crossings, and bikeways.

3.2 Non-motorized projects identified in specific non-motorized plans will be placed on the appropriate list.

3.3 Additional non-motorized projects requested by the public during formal calls for projects, concurrent with the development of the Capital Improvement Program (CIP), may also be listed. Before a proposed project is placed on a list, it will be reviewed by City Staff to determine its appropriateness and feasibility. A list of requested projects will be documented and provided to the Transportation Commission when project recommendations are considered.

3.4 Annually, all non-motorized projects appearing on the lists will be scored in accordance with Section 4.0 and ranked in accordance with Section 5.0. If new non-motorized projects are added, those new projects will also be scored and ranked. It must be noted that inclusion on a project list does not guarantee funding or implementation for a particular project.

4.0 Project Scoring

Non-motorized projects appearing on the Project Lists will be scored annually according

to the following criteria:

4.1 Pedestrian Gap/Crossings Prioritization Criteria

(a) *Priority Networks- 6 points max*

Projects that improve connectivity along priority networks recognized in adopted plans are accorded the highest weight. This criterion follows the Regional Pedestrian Plan Priority network: Safe Routes to School Routes without sidewalks on either side followed by Arterial and Collector Streets without sidewalks on either side followed by Arterial Streets, Collector Streets with sidewalk on one side and SRTS routes with sidewalk on one side and finally Local streets without sidewalk on either side and Local streets with sidewalk on one side.

(b) *Pedestrian Access to Priority Destinations – 5 points max*

Pedestrian demand is calculated based on adding cumulative points for each destination within range of the proposed project. Projects within closer proximity to destinations are given higher priority in order to promote access to high-demand pedestrian destinations. These scores are broken into quintiles and assigned a point range of 1 to 5.

Destinations: schools & unviersity buildings, public transit stops, neighborhood/ community retail, parks/public attractions, public/government institution, non profits, daycare & health clinic	
1/8 mile	3
1/4 mile	2
1/2 mile	1

(c) *Safety – 10 points max*

Higher volume roadways are granted greater priority, as well as projects that improve crossings on roadways over 7,500 AADT. Crossing improvements also receive points based on the AADT. While crash history is not necessarily considered in project scoring, project design will consider crash history.

	Pedestrian Gap/Crossings Prioritization Criteria	Points
	Priority Network (select one, max 6 pts)	
	Safe Routes to School Route with no existing sidewalks on either side	6
	Arterial/Collector Street Classification of Roadway with no sidewalks on either side	5
1	Arterial/Collector Street Classification of Roadway	4
	Safe Routes to School Route with sidewalk on one side	3
	Local Street Classification of Roadway with no sidewalks on either side	2
	Local Street Classification of Roadway	1
	Pedestrian Access to Priority Destinations (select one, max 5 pts) Cumulative pts for each destaination within range of the proposed project. Destinations include: schools & university buildings, public transit stop, neighborhood/community retail, park/public attraction, public/government institution, non profit, daycare & health clinic.	
2	The values greater than the Fourth quintile	5
	The values greater than the Third quintile up to the Fourth quintile	4
	The values greater than the Second quintile up to the Third quintile	3
	The values greater than the First quintile up to the Second quintile	2
	The values greater than zero up to the First quintile	1
	Safety - Roadway Volume (select one, max 5 pts)	
	Project on a road that has over 15,000 AADT on roadway	5
	Project on a road that has over 10,000 AADT on roadway	4
	Project on a road that has over 7,500 AADT on roadway	3
3	Project on a road that has over 5,000 AADT on roadway	2
	Project on a road that has over 2,500 AADT on roadway	1
	Safety - Crossing (select one, max 5 pts)	
	Project adds crossing improvements on a road over 15,000 AADT	5
	Project adds crossing improvements on a road over 10,000 AADT	3
	Project adds crossing improvements on a road over 7,500 AADT	1

Max Points: 21

4.2 Bikeway Prioritization Criteria

(a) *Adopted Plan Priorities- 5 points max*

Projects that improve connectivity along networks recognized in adopted plans are accorded the highest weight. This criterion recognizes the priority and secondary networks established by the Lawrence Bikes Plan.

(b) *Bicycle Demand Model – 5 points max*

Bicycle demand is calculated based on a scoring system that ranks areas based on 6 proximity factors: High density housing, medium density, K-12 schools, college/university, existing bike infrastructure and community service centers. Those factors affect the demand for bicycle transportation throughout the community. Areas of higher demand are prioritized.

- Proximity Factors (max points for bicycle demand model score is 125)
  - *High-Density Housing*
    A buffer of high-density housing. High-density housing, as defined in the updated comprehensive plan, is greater than or equal to 16 people per acre.
  - *Medium-Density Housing*
    A buffer of medium-density housing. Medium density housing, as defined in the updated comprehensive plan, is greater than or equal to 7 people per acre and less than 16 people per acre.

- *Schools K-12*
  A buffer distance from the property boundaries of public and private schools, kindergarten through 12th grade.
- *College / University*
  A buffer distance from college/university boundaries.
- *Existing Bikeway (Major/Minor/Shared Street)*
  A buffer distance from existing bikeways by type.
- *Community Service Centers*
  A buffer distance from the top 24% of retail employment centers based on traffic analysis zones and park entrances.

Proximity Factors & Scores

High Density Housing	
within 0.25 mile	16
within 0.5 mile	12
within 1 mile	8
within 2 miles	4

Schools K-12	
within 0.25 mile	18
within 0.5 mile	14
within 1 mile	6
within 2 miles	2

Community Service Centers/Parks	
within 0.25 mile	20
within 0.5 mile	18
within 1 mile	15
within 2 miles	7

Medium Density Housing	
within 0.25 mile	9
within 0.5 mile	7
within 1 mile	3
within 2 miles	2

College/University	
within 0.25 mile	20
within 0.5 mile	18
within 1 mile	15
within 2 miles	7

Existing Bikeway Major Separation	
within 0.25 mile	18
within 0.5 mile	14
within .75 mile	10

Existing Bikeway Minor Separation	
within 0.25 mile	14
within 0.5 mile	10
within .75 mile	6

Existing Bikeway Shared Street	
within 0.25 mile	10
within 0.5 mile	6

(c) *Safety – 10 points max*
Higher volume roadways are granted greater priority, as well as projects that improve crossing on roadways over 7,500 AADT. While crash history is not necessarily considered in project scoring, project design will consider crash history.

	Bikeway Prioritization Criteria	Points
1	**Adopted Plan Priorities (select one, max 6 pts)**	
	Lawrence Bikes Plan Priority Network	6
	Lawrence Bikes Plan Secondary Network	4
	Lawrence Bikes Plan future bikeway	3
	Arterial/Collector with no Shared Use Path	2
2	**Bicycle Demand (select one, max 5 pts)**	
	Bicycle demand is calculated on the bicycle demand heat map which is a prioritization score based on proximity to housing density, K-12 private/public schools, college/university and existing bikeway infrastructure.	
	The values greater than the Fourth quintile	5
	The values greater than the Third quintile up to the Fourth quintile	4
	The values greater than the Second quintile up to the Third quintile	3
	The values greater than the First quintile up to the Second quintile	2
	The values greater than zero up to the First quintile	1
3	**Safety - Roadway Volume (select one, max 5 pts)**	
	Project on a road that has over 15,000 AADT on roadway	5
	Project on a road that has over 10,000 AADT on roadway	4
	Project on a road that has over 7,500 AADT on roadway	3
	Project on a road that has over 5,000 AADT on roadway	2
	Project on a road that has over 2,500 AADT on roadway	1
	Safety - Crossing (select one, max 5 pts)	
	Project adds crossing improvements on a road over 15,000 AADT	5
	Project adds crossing improvements on a road over 10,000 AADT	3
	Project adds crossing improvements on a road over 7,500 AADT	1

Max points:21

5.0 Project Ranking and Selection

5.1 The scoring procedure outlined above provides the first step in identifying corridors that should be considered for non-motorized improvements. There are also many other, non-exclusive factors that should be considered in the final selection of non-motorized projects and, ultimately, in project design. Those non-exclusive factors are as follow:

- Equity in project distribution (environmental justice areas)
- Opportunities for parallel routes
- Grant funding opportunities
- Economies of scale
- Cost sharing opportunities
- Available funding
- Other relevant factors such as cultural, social and economic benefit

5.2 The following procedure will be used to determine a final project ranking:

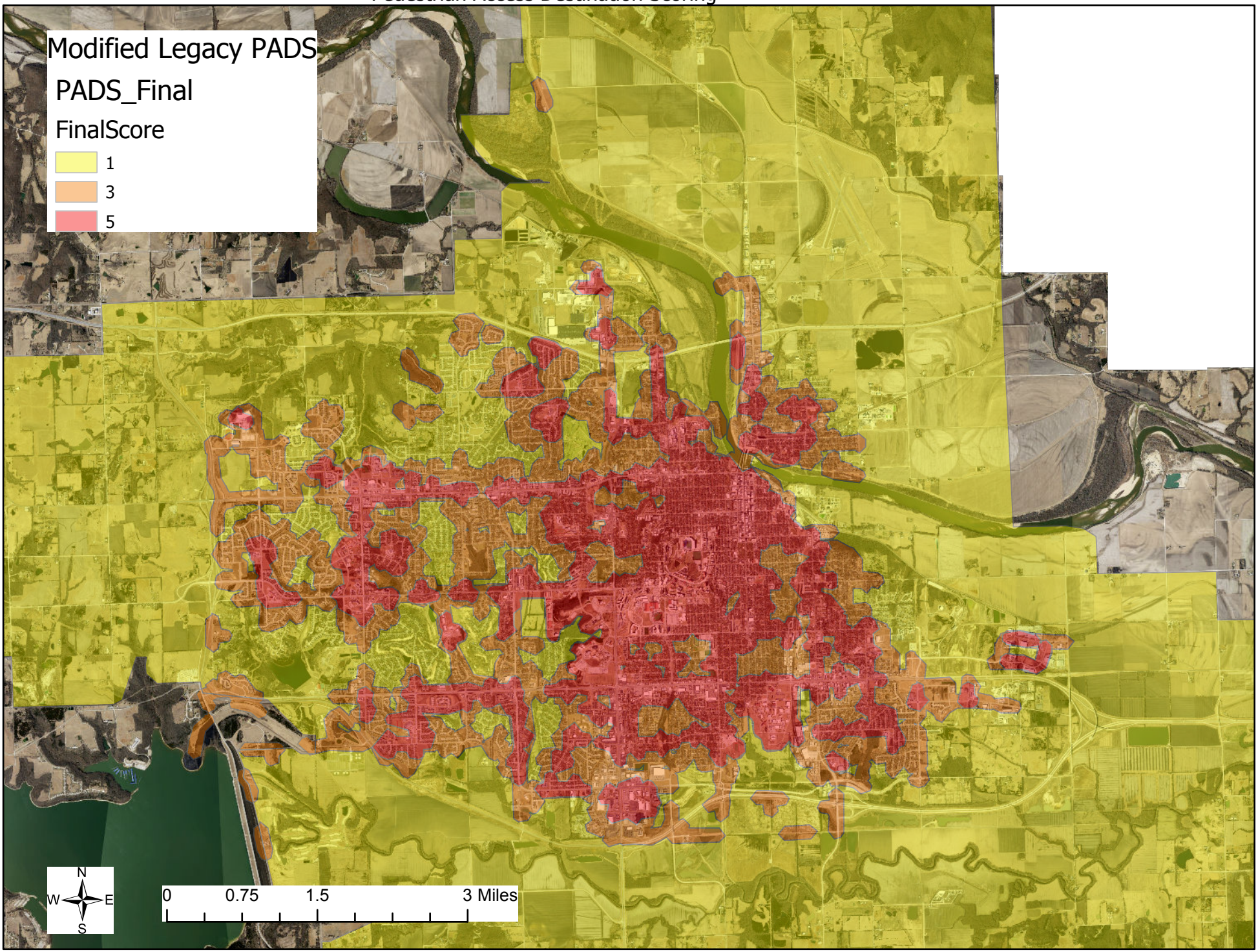
(a) The available funding for non-motorized infrastructure will be distributed between the two category areas (pedestrian gaps/crossings, and bikeways) by recommendation of the Transportation Commission.

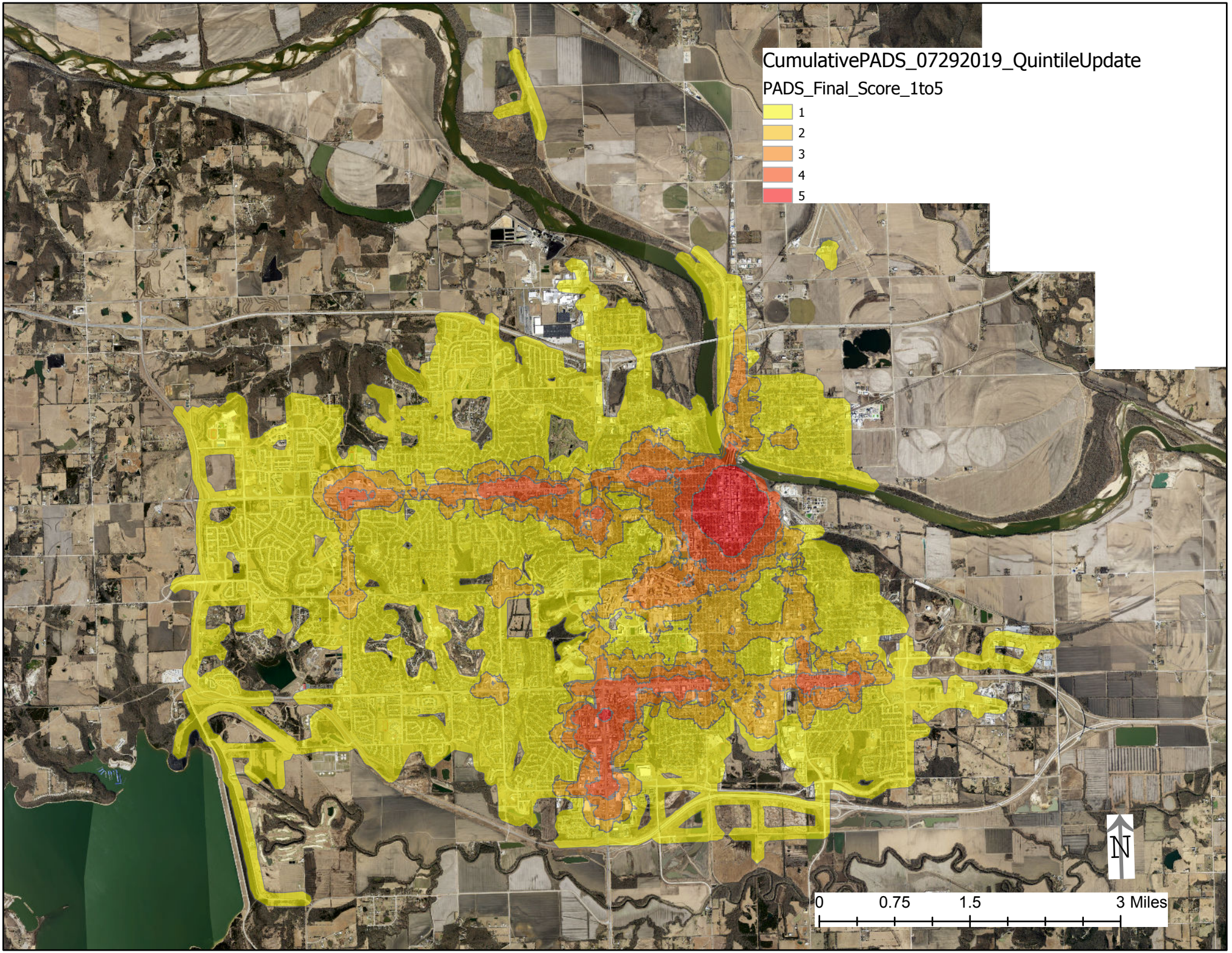
(b) City Staff will review the projects with the highest scores in each category. Project feasibility will be evaluated and planning-level cost estimates will be prepared.

(c) City Staff will present to the Transportation Commission for consideration, a list of projects ranked, using the established criteria and other factors as outlined above, for pedestrian gap/crossings and bikeway projects

(d) The Transportation Commission will recommend to the City Commission for approval, a final ranked project list for each category.

Pedestrian Access Destination Scoring

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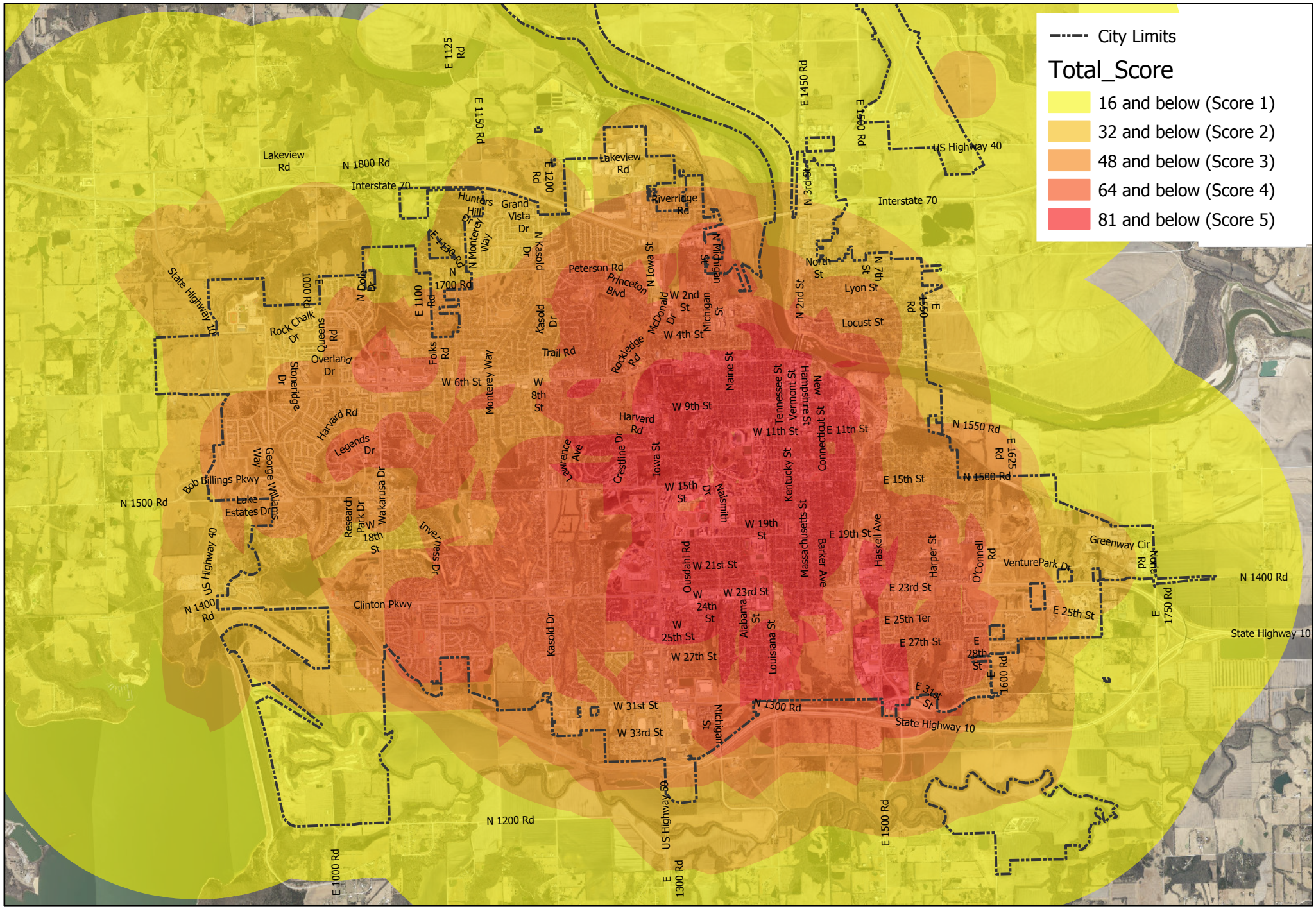
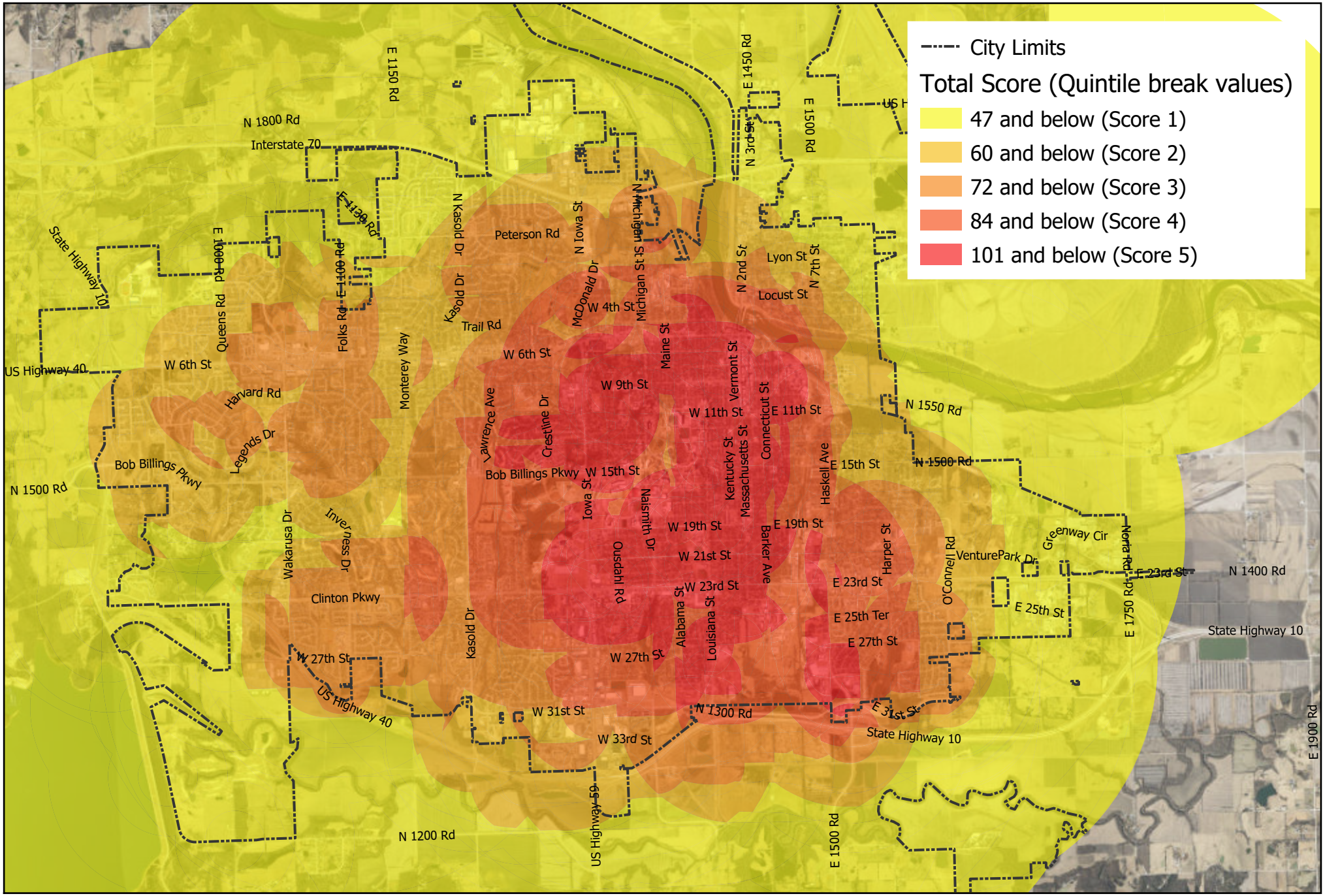
PADS_Final_Score_1to5
1
2
3
4
5
N
0
0.75
1.5
3 Miles

Bicycle Demand Model - 2017 Version



Bicycle Demand Model Update

Map Update: 7/30/2019



Jessica Mortinger

From: no kona <hillberger32@hotmail.com>
Sent: Wednesday, August 29, 2018 8:39 AM
To: Jessica Mortinger; Erin Paden
Cc: Kathryn Tuttle; no kona; Courtney Shipley
Subject: DRAFT Non-motorized Projects Prioritization Policy
Attachments: Non-motorized Projects Prioritization Policy_August 21.doc

Jessica and Erin,

Thank-you for meeting with us (Jessica at the LAN meeting and Erin last Monday). We appreciate the time that you, the Transportation Commission and the City Staff give to helping Lawrence be even better! In our discussions this week with Erin, she requested we send you the attached DRAFT Non-motorized Projects Prioritization Policy. We understand you have talked and the ideas sound good but how and when they are incorporated is the question.

During the August LAN meeting, we felt Jessica and Amanda were clear they had a lot on their plates and were already working numerous City Policies. To facilitate a review of the Non-motorized Projects Prioritization Policy by the City Staff, A LAN sub-group got together, read the associated City Plans and Reports and have made the suggestions shown in the attached Draft Policy. Additions are show in blue and deletions in red. Our intent has been to improve or build on the work of the City Staff so that the Policy better addresses the needs of our Lawrence Neighborhoods. We know there are further improvements to be made. During our discussions just this week changes have been identified, such as incorporating Neighborhood to Neighborhood connections (it's very difficult going from Pinckney to OWL for example). And we also want to be sure we incorporate changes that facilitate critical neighborhoods like BrookCreek where walking and biking are their primary modes of transportation.

Policy revisions now will impact projects in 2019-2020. Waiting even longer to address the policy means waiting till 2020-2021. We are willing to help anyway we can to speed up the process and ensure linking together all the Policies.

Tresa Hill
842-9938

City of Lawrence, Kansas Transportation Commission Non-motorized Projects Prioritization Policy

SUBJECT Non-motorized Projects Prioritization Policy		**APPLIES TO** Infrastructure	
EFFECTIVE DATE Feb 5, 2018	**REVISED DATE** August 2018	**NEXT REVIEW DATE** TBD	
APPROVED BY Transportation Commission date: Feb 5, 2018		**TOTAL PAGES** 5	**POLICY NO.** TC18-001

1.0 Purpose

In order to improve the built environment for people who walk, bicycle, or wheel, this policy implements recommendations of the Regional Pedestrian Plan, the Countywide Bikeway Plan, and the Pedestrian-Bicycle Issues Taskforce Report, and establishes a data-driven ranking procedure for prioritizing non-motorized projects and identifying those that confer the greatest benefit to the community.

2.0 Scope

This policy applies to all non-motorized projects, including but not limited to the following: ADA curb ramps, sidewalks, curb extensions, shared-use paths, bike lanes, protected bike lanes, bicycle boulevards, signage, crossing improvements, and other projects that improve the built environment for people who walk, bicycle or wheel. This policy does not apply to non-motorized aspects of larger roadway projects that are not funded with pedestrian and bicycle funds (although such non-motorized projects may be ranked) or to sidewalk maintenance, which is the responsibility of abutting landowners.

3.0 Development of Project Lists

3.1 Non-motorized projects will be sorted into three lists: ADA ramps, pedestrian gaps, and bikeways.

3.2 Non-motorized projects identified in specific non-motorized plans will be placed on the appropriate list.

3.3 Additional non-motorized projects requested by the public during formal calls for projects, concurrent with the development of the Capital Improvement Program (CIP), may also be listed. Before a proposed project is placed on a list, it will be reviewed by City Staff to determine its appropriateness and feasibility. Rejected projects will be documented and the initiators notified.

3.4 Annually, all non-motorized projects appearing on the lists will be scored in accordance with Section 4.0 and ranked in accordance with Section 5.0. If new non-motorized projects are added, those new projects will also be scored and ranked. It must be noted that inclusion on a project list does not guarantee funding or implementation for a particular project at this time.

4.0 Project Scoring

Non-motorized projects appearing on the Project Lists will be scored annually according to the following criteria:

4.1 ADA Ramp Prioritization Criteria

(a) *Priority Networks- 5 points max*

Projects that improve accessibility along priority networks recognized in adopted plans are accorded the highest weight. This criterion follows the Regional Pedestrian Plan Priority network: Safe Routes to School Routes are accorded the highest priority, followed by Arterial Streets and Pedestrian Priority Network, then Collector Streets, and finally Local streets.

(b) *Pedestrian Access to Priority Destinations – 5 points max*

Projects within closer proximity to priority destinations are given higher priority in order to promote access to high-demand pedestrian destinations. This score is symbolized on a map produced by creating buffers (based on the pedestrian network routing) of identified locations. Points are cumulative for multiple destinations indicating a greater need or what is best for most.

(c) *Crossing Type – 5 points max*

Projects that are located at signalized intersections are accorded the highest weight. Stop signs or beacon controlled crossings compose the next highest weight. Next are other marked crossings and then, lastly, unmarked crossings. The type of crossing is used as a priority an important criterion because the highest volume of pedestrian demand is anticipated at controlled intersections.

(d) *User Request for Improved Route Accessibility – 10 points max*

This involves ramp requests made by citizens, or in their behalf, who use mobility devices, to provide specific accessible routes based on their location and travel needs and that are received through the ADA Transition Plan Coordinator. Such requests can be made at any time.

	ADA Ramp Prioritization Criteria	Points
1	**Priority Network (School Plus Roadway Classification pts) (select one, max 5 pts)**	
	Safe Routes to School Route (including private schools)	5
	Arterial Street Classification of Roadway or Pedestrian Priority Network	4
	Collector Street Classification of Roadway	3
	Local Street Classification of Roadway	1
2	**Pedestrian Access to Priority Destinations (Destinations are cumulative based on distance i.e. 1/8 or ¼ or ½ mi) (select one, max 5 pts)**	
	Within ¼ mi of school, library, park, pool or $^1/_8$ mi of public transit stop	5
	Within ½ mi of school, library, park, pool, ¼ mi of transit stop, ¼ mi of neighborhood or community retail (includes medical facilities, grocery store, farmers market and retail food outlets, senior/community center and church or other neighborhood or community retail, 1/8 mi of park, 1/8 mi of library, or 1/8 of post office, and city/county offices	3
	Farther than ½ mi of school, library, park, pool, ¼ mi of transit stop, ¼ of neighborhood or community retail medical facilities, grocery store, farmers market and retail food outlets, senior/community center and church or community retail 1/8 mi of park, 1/8 mi of library, or 1/8 mi of public institutions (ex: post office, and city/county offices hall)	1
3	**Crossing Type (select one, max 5 pts)**	
	Signalized Controlled Intersections	5
	Stop Sign or Beacon Controlled Crossings or connecting curb ramps	4
	Other Marked Crossings	2
	Unmarked Crossings	1
4	**User Request for Improved Route Accessibility(max 10 pts)**	10
	Max Points -25	

4.2 Pedestrian Gap Prioritization Criteria

(a) *Priority Networks- 5 points max*

Projects that improve connectivity along priority networks recognized in adopted plans are accorded the highest weight. This criterion follows the Regional Pedestrian Plan Priority network: Safe Routes to School Routes are accorded the highest priority, followed by Arterial and Collector Streets without sidewalks on either side or Pedestrian Priority Network followed by Arterial Streets, Collector Streets and finally Local streets.

(b) *Pedestrian Access to Priority Destinations – 5 points max*

Projects within closer proximity to priority destinations are given higher priority in order to promote access to high-demand pedestrian destinations. This score is symbolized on a map produced by creating buffers (based on the pedestrian network routing) of identified locations. Points are cumulative for multiple destinations or pedestrian corridors that provide the most people with access to the most parts of town (what is best for most). Destinations attracting children are given higher priority.

(c) *Safety – 10 points max*

Higher volume roadways are granted greater priority, as well as projects that improve crossing on roadways over 15,000 AADT. While crash history is not necessarily considered in project scoring, project design will consider crash history.

	Pedestrian Gap Prioritization Criteria	Points
1	**Priority Network (School Plus Roadway Classification pts) (select one, max 5 pts)**	
	Safe Routes to School Route (including private schools)	5
	Arterial/Collector Street Classification of Roadway with no sidewalks on either side or Pedestrian Priority Network or connections between neighborhoods.	4
	Arterial Street Classification of Roadway	3
	Collector Street Classification of Roadway	2
	Local Street Classification of Roadway	1
2	**Pedestrian Access to Priority Destinations (Destinations are cumulative based on distance i.e. 1/8 or ¼ or ½ mi) (select one, max 5 pts)**	
	Within ¼ mi of school, library, park, pool or 1/8 mi of public transit stop	5
	Within ½ mi of school, library, park, pool ¼ mi of transit stop, ¼ mi of neighborhood or community retail (includes medical facilities, grocery store, farmers market and retail food outlets, bike path, Post Office, City/County Offices, City/KU/School events, Senior/Community Center, KU and church), 1/8 mi of park, 1/8 mi of library, or 1/8 of post office	3
	Farther than ½ mi of school, library, park, pool ¼ mi of transit stop, ¼ of neighborhood or community retail, medical facilities, grocery store, farmers market and retail food outlets, bike path, Post Office, City/County Offices, City/KU/School events, Senior/Community Center, KU and church 1/8 mi of park, 1/8 mi of library, or 1/8 mi of public institutions (ex: post office, city hall)	1
3	**Safety - Roadway Volume (select one, max 5 pts)**	
	Project on a road that has over 25,000 AADT on roadway	5
	Project on a road that has over 20,000 AADT on roadway	3
	Project on a road that has over 15,000 AADT on roadway	1
	Safety - Crossing (max 5 pts)	
	Project adds crossing improvements on a road over 15,000 AADT or Pedestrian Priority Network or adds improvements for safe accessibility	5
	Max Points -20	

4.3 Bikeway Prioritization Criteria

(a) *Adopted Plan Priorities- 5 points max*

Projects that improve connectivity along networks recognized in adopted plans are accorded the highest weight. This criterion recognizes the priority network established by the Ped Bike Issues Taskforce Report and the Countywide Bikeway Plan.

(b) *Bicycle Demand Model – 5 points max*

Bicycle demand is calculated based on a scoring system that ranks areas based on 5 6 proximity factors: High density housing, medium density, K-12 schools, college/university, community service centers, existing bike infrastructure. Those factors affect the demand for bicycle transportation throughout the community. Areas of higher demand are prioritized.

Proximity Factors (max points for bicycle demand model score is 81)

- *High-Density Housing*

  A buffer of high-density housing. High-density housing, as defined in the updated comprehensive plan, is greater than or equal to 16 people per acre.

- *Medium-Density Housing*
  A buffer of medium-density housing. Medium density housing, as defined in the updated comprehensive plan, is greater than or equal to 7 people per acre and less than 16 people per acre.
- *Schools K-12*
  A buffer distance from the property boundaries of public and private schools, kindergarten through 12th grade.
- *College / University*
  A buffer distance from college/university boundaries.
  Community Service Centers
  A buffer from the main entry point of public facilities, including, but not limited to: City Hall, County Courthouse, police and sheriff offices, satellite government offices, Public Library, parks and recreation centers, medical facilities, neighborhood retail centers.
- *Existing Shared Use Path or Bike Lane*
  A buffer distance from existing shared use paths/bike lanes.

Proximity Factors and Scores

High Density Housing	
wihtin 1/4 mile	16
within 1/2 mile	12
within 1 mile	8
within 2 miles	4

Schools K-12 (public & private)	
wihtin 1/4 mile	18
within 1/2 mile	14
within 1 mile	6
within 2 miles	2

Existing Shared Use Path/Bike Lane	
wihtin 1/4 mile	18
within 1/2 mile	14
within 1 mile	6
within 2 miles	2

Medium Density Housing	
wihtin 1/4 mile	9
within 1/2 mile	7
within 1 mile	3
within 2 miles	2

College/University	
wihtin 1/4 mile	20
within 1/2 mile	18
within 1 mile	15
within 2 miles	7

Community Service Centers	
Within ¼ mile	20
Within ½ mile	18
Within 1 mile	15
Within 2 miles	7

(c) *Safety – 10 points max*
Higher volume roadways are granted greater priority, as well as projects that improve crossing on roadways over 15,000 AADT. While crash history is not necessarily considered in project scoring, project design will consider crash history.

	Bikeway Prioritization Criteria	Points
1	**Adopted Plan Priorities (select one, max 5 pts)**	
	Along the Ped/Bike Issues Taskforce Report Long Term Bikeway Priority Network	5
	Along network identified in approved Countywide Bikeway Plan	4
	Arterial/Collector with no Shared Use Path	3
2	**Bicycle Demand (select one, max 5 pts)**	
	Bicycle demand is calculated on the bicycle demand heat map which is a prioritization score based on proximity to housing density, K-12 private/public schools, college/university and existing bikeway infrastructure.	
	score greater than 66 up to 81	5
	score greater than 49 up to 65	4
	score greater than 33 up to 49	3
	score greater than 17 up to 33	2
	score greater than 0 up to 17	1
3	**Safety - Roadway Volume (select one, max 5 pts)**	
	Project on a road that has over 25,000 AADT on roadway	5
	Project on a road that has over 20,000 AADT on roadway	3
	Project on a road that has over 15,000 AADT on roadway	1
	Safety - Crossing (max 5 pts)	
	Project adds crossing improvements on a road over 15,000 AADT	5
	Max Points - 20	

5.0 Project Ranking and Selection

5.1 The scoring procedure outlined above provides the first step in identifying corridors that should be considered for non-motorized improvements. There are also many other, non-exclusive factors that should be considered in the final selection of non-motorized projects and, ultimately, in project design. Those non-exclusive factors are as follow:

- Equity in project distribution (environmental justice areas)
- Opportunities for parallel routes
- Grant funding opportunities
- Economies of scale
- Cost sharing opportunities
- Available funding
- Other relevant factors

Documentation of the use of these non-exclusive factors for lower ranked projects will be provided.

5.2 The following procedure will be used to determine a final project ranking:

(a) The available funding for non-motorized infrastructure will be distributed between the three category areas (ADA ramps, pedestrian gaps, and bikeways) by recommendation of the Transportation Commission.

(b) Funding availability is not restricted to infrastructure sales tax collected in any given year, but may also include property tax, sales tax reserve fund, special assessments, and general obligation debt.

(c) City Staff will review the projects with the highest scores in each category. Project feasibility will be evaluated and planning-level cost estimates will be prepared.

(d) City Staff will present to the Transportation Commission for consideration, a list of projects ranked, using the established criteria and other factors as outlined above, for pedestrian gap and bikeway projects. City Staff will recommend Ramp projects, based not on specific locations but on recommended areas of focus.

(e) The Transportation Commission will recommend to the City Commission for approval, a final ranked project list for each category.

Jessica Mortinger

From: Marilyn Hull <mhull1011@gmail.com>
Sent: Thursday, February 14, 2019 11:18 AM
To: Amanda Sahin
Cc: David Cronin; Jessica Mortinger
Subject: Updating the Non-Motorized Project Prioritization Policy

David and Jessica: I would appreciate it if this email could be shared with Transportation Commissioners before or at their retreat. Thanks.

Dear Transportation Commissioners:

I would like to recommend that the Transportation Commission consider updating the current non-motorized project prioritization rubric to take a more holistic view of projects' overall community benefits. In particular, I recommend that you consider revising the bikeway scoring policy this year to capture the recreational, cultural, community building and economic benefits of projects, as well as their transportation benefits.

The City's current strategic priorities include sound financial stewardship, in which "decisions are made by prioritizing across all government services considering needs…." The current bikeway prioritization rubric rightly considers transportation-related factors such as adopted bikeway plan priorities, bicycle demand, and safety. However it does not look across all government services, as called for in the City Commission's strategic plan. A more inclusive rubric would also factor in a project's value to the community as a recreational facility, a cultural event space, and a tourism asset. I believe City Commissioners would appreciate recommendations from you that consider all of these factors.

Projects to complete sections of the Lawrence Loop are examples that may stand to benefit from a more holistic scoring rubric. City surveys, and public input related to the Lawrence Parks and Recreation Master Plan, consistently show that citizens want the City to make trail development a high priority because trails support transportation, health, community building and economic well being.

In an email exchange with Amanda Sahin last month, I was told that no updates to the prioritization rubric would be made until 2021. I ask that you consider revising the policy sooner so that City Commissioners receive the best advice possible on funding non-motorized projects in 2020 and beyond.

Thank you for your consideration.

Jessica Mortinger

From: Chris Tilden <christilden@hotmail.com>
Sent: Thursday, February 14, 2019 2:59 PM
To: Amanda Sahin; Jessica Mortinger; David Cronin
Subject: multimodal project scoring rubric

I would like to thank the Transportation Commission and staff for the development of a non-motorized project prioritization rubric to ensure that city funds are used in the best possible way to develop an effective "active transportation network" across our community. I would like to suggest in future updates that the rubric capture a broader view of community benefit. In particular, I think the rubric should capture not only transportation benefits, but also recreational, cultural, social and economic benefits. This would create better alignment with the City Commission's Strategic Plan, which seeks to prioritize decisions across all government services. Transportation projects would be better evaluated against other government initiatives if examined across a broader set of criteria that more holistically measure community benefit.

Thank you for your consideration.

Chris Tilden
1121 Williamsburg Court

Memorandum
City of Lawrence
Municipal Services & Operations

TO: Transportation Commission
FROM: Jake Baldwin, Senior Project Engineer
DATE: July 26, 2019
RE: August 5, 2019 – 2019 Sidewalk/Bike/Ped Imp./ADA Funding Update

Background

The 2019 CIP includes project CI09 "Sidewalk/Bike/Ped Improvements/ADA Ramps" under the Capital Improvement Reserve Fund - Infrastructure with $600,000 in funding.

Recommended Allocations – Transportation Commission 6/3/19

1. $200,000 to complete the 2018 Sidewalk Gaps & ADA Ramps Project (2/19/19 CC)
2. $250,000 to 2019 Bicycle Boulevards
3. $150,000 to 2018 Safe Routes to School Phase 2

Approved Allocations – City Commission

1. $200,000 to complete the 2018 Sidewalk Gaps & ADA Ramps Project (2/19/19 CC)
2. $73,000 to 2019 Bicycle Boulevards (7/2/19)
3. $150,000 to 2018 Safe Routes to School Phase 2 (7/2/19)
4. $75,000 to 2019 Lawrence Loop (7/16/19)

Remaining Funds – to be rolled over into 2020 NMPP Projects

1. $102,000 Difference between Approved Allocations and 2019 Budget
2. $24,000 in potential savings on Safe Routes to School Phase 2 Construction

Action
Receive information

Attachments
None

2019 CITY OF LAWRENCE
TRANSPORTATION COMMISSION CALENDAR

Study Sessions begin at 5:00PM
Regular Meetings begin at 6:00PM

January – No meeting	February 4	March 4
April 1	**May 6**	**June 3**
Study Session: • Strategic Plan; CIP/budget process • Receive update on Transit Hub Regular Meeting: • Discussion on composition of Transportation Commission	Study Session: • Review Pedestrian Bicycle Issues Task Force Report Regular Meeting: • Discussion on composition of Transportation Commission • Recommendation on 2019 Neighborhood Traffic Management Program	Study Session: • Update on Safe Routes to School Plan • School Area Traffic Control Policy • Receive draft Lawrence Bike Plan Regular Meeting: • Recommendation on 13th Street & 21st Street Bike Boulevard Concept Plan • Recommendation on 2019 Bike/Ped Projects
July 1	**August 5**	**September 9**
Study Session: • Non-motorized Project Prioritization Regular Meeting: •	Study Session: • Information on regulations for electric vehicles. • Receive request from VeoRide to amend contract for bike share to include e-scooters. Regular Meeting: • Recommend approval of Lawrence Bike Plan • Recommend approval of Non-motorized Project Prioritization	Study Session: • Transportation/Land-Use Relationship Regular Meeting: • East 23rd Street Planning Study
October 7	**November 4**	**December 2**
Study Session: • Update on sidewalk maintenance program Regular Meeting: • Kasold – 22nd Street to Clinton Parkway • E. 19th Street – Haskell to O'Connell design options	Study Session: • Update on Parking and Access revisions to Land Development Code Regular Meeting:	Study Session: • ADA Transition Plan update Regular Meeting:

Future Study Session Topics:

- Downtown Master Plan parking/multi-modal transportation components
- City Comprehensive Plan and Transportation Plan
- Lawrence Loop – 8th Street to 11th Street and 29th Street Project
- STAR transition to LEED (Sustainability Coordinator)
- Distracted Driving
- Grant Opportunities

Future Regular Meeting Items:

- Crossing - 11th St & New Hampshire

Revised: 7/24/2019