TOOLE DESIGN

SPOKANE SHARED MOBILITY STUDY FINAL RECOMMENDATIONS

Spokane, Washington

February 21, 2019

CONTENTS

CHAPTER 1
INTRODUCTION

1. INTRODUCTION

Shared mobility programs have successfully increased transportation options for communities across the United States and have recently grown in number and popularity. For example, in 2017, the number of bikeshare bikes in the U.S. more than doubled – from 42,500 bikes at the end of 2016 to about 100,000 bikes by the end of 2017.[1] Similarly, the electric-scooter (e-scooter) share operator Lime reported being in over 70 markets within 12-months of operations in the United States.[2]

Since 2010, traditional bikeshare programs have been implemented using the technologies and resources available to them at the time. They were designed so that bikes could be checked out and returned to designated stations and specific bike rack and station designs were used so that users could lock and unlock bikes. Over the last few years, bicycle and cell phone technologies have advanced so that designated stations are no longer necessary, electric-assist bicycle technology has developed to now allow "e-bikes" to be a financially viable option for some bikeshare programs, and new funding models have allowed the private sector to greatly increase their delivery of these programs. Now, users can find and unlock bikes using smartphones and bikes do not need to be parked at stations.

Within the last two years, an increasing number of bikeshare programs have become "dockless" and incorporated e-bikes. Similarly designed programs for e-scooters have also launched in cities across the country and are growing rapidly. Traditional bikeshare programs are no longer the only model available to communities who wish to increase active transportation and expand mobility options in their communities. These new, shared transportation programs, which include dockless bikes, e-bikes, and e-scooters, are collectively part of shared mobility.

WHAT IS SHARED MOBILITY?

The term "shared mobility" describes transportation systems that make use of a pool of resources that can be used by a broad group of people to increase their transportation and mobility options. For this report, "shared mobility" refers to traditional docked and dockless bikeshare, e-assist bicycles within a bikeshare platform, and e-scooter programs.

In Spokane, a pilot program was established to trial dockless e-scooters, e-assist bikes, and regular bikes for the 74-day period from September 4, 2018 through to November 16, 2018. During that time, just over 135,000 trips were taken using the program.[3]

The City of Spokane commissioned this analysis to evaluate the pilot program and develop recommendations for a permanent program. This report will guide the City of Spokane and other stakeholders as they implement and oversee shared mobility programs in the City.

Specifically, this report analyzes the pilot program from three different angles. First, an online survey was used to understand community attitudes toward the pilot program and how they see the program moving forward. Second, field work was conducted to evaluate how the pilot program operated on the ground – specifically to look at vehicle condition and parking behavior. Finally, data from the program was analyzed to understand ridership and usage trends. These evaluations were compared to national best practice in policy and system planning to form long-term recommendations for the program in Spokane.

[1] Bike Share in the US: 2010-2017. National Association of Community Transportation Officials (NACTO). https://nacto.org/bike-share-statistics-2017/
[2] Lime – One Year Report. Accessed on January 15, 2019 at: https://www.li.me/hubfs/Lime_Official_One_Year_Report.pdf
[3] Lime API for Spokane, WA. https://data.lime.bike/api/partners/v1/mds/spokane

CHAPTER 2
PUBLIC ENGAGEMENT ANALYSIS

2. PUBLIC ENGAGEMENT ANALYSIS

An online survey was used to collect input from the public about the shared mobility pilot program. The survey was open from August 4 to November 20, 2018 and was publicized using social media posts, listservs, local news outlets, and emails sent by Lime to their membership. The survey received 4,264 views and was completed by 3,476 people. The survey was designed with two tracks to help understand the preferences of program users and non-users. The questions asked respondents about their opinions and experience with the program and collected demographic data to understand if any particular groups were underrepresented by the survey responses.

Sixty-four percent (64%) of survey respondents used bikeshare, e-scooter share, or both over the course of the pilot. Thirty-six percent (36%) of survey respondents had not used the program. The key findings of the survey are described below.

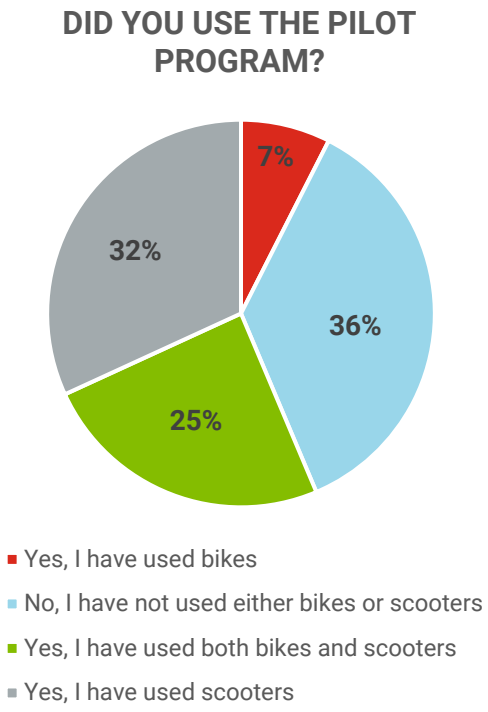

Figure 1: Survey respondents' use of the pilot shared mobility program in Spokane.

BIKESHARE AND E-SCOOTER SHARE USERS

Questions for program users focused on understanding the types of trips they made with bike or e-scooter share, the reasons they used the program, and understanding their experience with the program. Overall, there were 2,219 survey respondents who used the pilot program.

PREFERENCES

- Respondents who used the program heard about it through a number of media. Sixty-two percent (62%) of users had seen somebody on a bike or e-scooter and 67% had seen a cluster of bikes or e-scooters. As well, users had heard about the program in an article or news story (52%), on social media (37%), and/or from a relative or friend (14%). Far fewer respondents had heard about it through formal programs, e.g., the City's website (4%), employer outreach information (7%), bike or e-scooter share representatives (3%), or community events (3%). The difference between more formal outreach methods and visual and "word-of-mouth" methods underlines the importance of visibility and customer experience to the success of shared mobility programs.
- The majority of respondents who used the program reported using it once or twice per week (53%). Less than 10% reported using it more than five times per week.
- Respondents who used the program were asked what transportation modes they replaced during a typical week (multiple responses were allowed). Eighty-two percent (82%) of respondents stated that they replaced a car trip at least once during a typical week; 63% replaced at least one walking trip; others reported replacing personal bike, personal scooter, and ride share trips. Transit trips were the least replaced.
- Respondents who used the program were asked the reasons they used it in a typical week (and were able to select multiple reasons). The "fun factor" was a significant reason for riding with nearly 60% of bikeshare users and 75% of e-scooter users saying they took a trip "for fun" or "to ride with friends or

family." The "novelty" of trying the program was also popular with 61% of bikeshare users and 65% of e-scooter share users citing this factor as a reason for making a trip. Further, between 33% and 41% of respondents who used the bikes, rode the bikes for transportation to work or school; to run errands; or to go to restaurants or entertainment. Twenty-one percent (21%) to 46% of respondents who used scooter share rode scooters for transportation to work or school; to run errands; or to go to restaurants or entertainment.

- Over 50% of respondents who used the program said that the biggest barrier to using it more was because bikes or e-scooters were not located where they needed them suggesting that more vehicles or better distribution is needed. The next most common answer (26%) was that there are not enough bike lanes or trails, which indicates that some users do not feel comfortable making trips with the current state of infrastructure.

EXPERIENCE

- A majority of respondents who used the program (53%) said that they only spent one to five minutes looking for their scooter or bike, which is approximately a quarter-mile walk and within the typical range that someone would walk to a local bus stop. Twenty-seven percent (27%) of respondents spent five to ten minutes finding a vehicle. Only 20% of respondents were prepared to spend more than ten minutes to find a vehicle. This is consistent with other public transportation modes where if the mode is too far away or takes too much time, users will choose another transportation mode.
- Overall, respondents who used the program had positive experiences. However, 17% of respondents stated that they had issues with the bike or scooter, 10% stated that the e-bike or e-scooter wasn't properly charged, and 9% stated that the program was more expensive than they had expected (see Figure 2). Responses also indicated that few users contacted the City or Lime over the course of the pilot but those that did generally had good experiences.

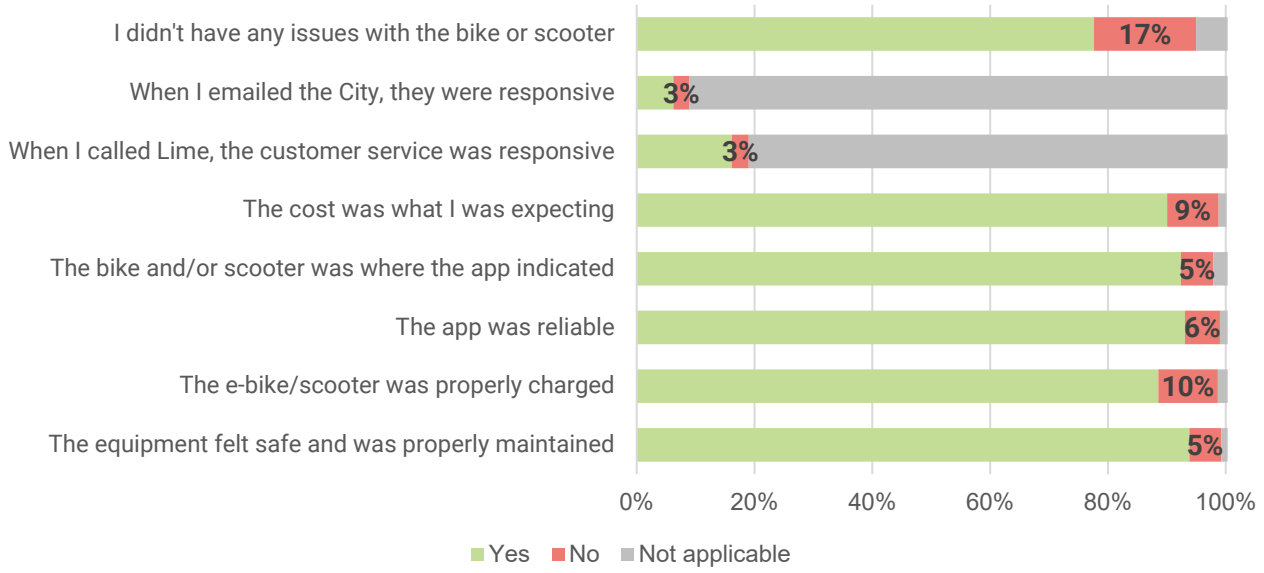

Figure 2: User experience with the shared mobility pilot program in Spokane.

- Overall, most respondents that used the program did not wear a helmet during their most recent trip. Only 21% of e-scooter users reported wearing a helmet compared to 27% of bikeshare users.
- When asked what types of infrastructure the respondent used on their last ride, the responses showed that most trips involved more than one type of infrastructure (see Figure 3). Just over half (51%) of all

bikeshare trips used the sidewalk for at least part of their trip. This percentage was even higher (72%) for scooter users. In terms of street infrastructure – more than half (54%) of scooter trips included using a bike lane. Surprisingly this was lower for bikeshare riders at only 38%. Approximately 30% of users of either mode rode in the travel lane on a street. It is not certain if this was by choice or necessity due to a lack of separated facilities. Almost half of users used a multi-use path as part of their trip.

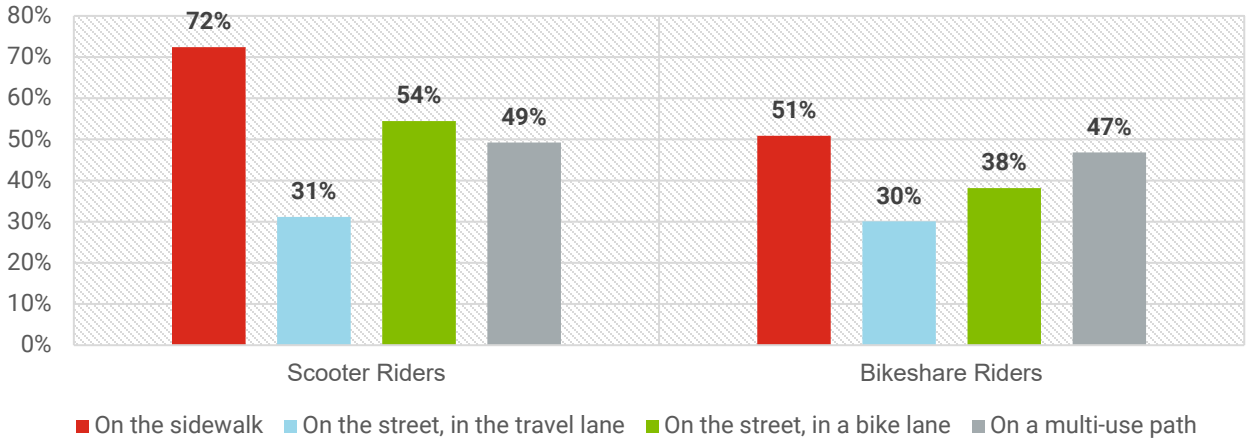

Figure 3: Percentage of e-scooter and bikeshare users using different infrastructure types during the shared mobility pilot program in Spokane (multiple selections allowed).

- When asked if they chose to use the program because of the electric assist option, 86% of respondents who rode an e-scooter last chose to because of the electric-assist option, as did 76% of bikeshare users.

NON-USERS

Just over 1,200 survey respondents had not used either the e-scooter or bikeshare program at the time they took the survey. These respondents were guided towards a different set of questions to get their opinions on the program, the reasons that they had not tried it, and to gauge their opinions on the long-term future of the program. When asked how they typically get around, 93% of these respondents said they use a car; 61% said that they regularly walk; and 21% use a personal bike or e-scooter.

PREFERENCES

- Even though they had not used the program, over half (55%) of non-users said that they were interested in trying it. Of those, most were interested in using an e-scooter (77%), followed by electric assist bikes (60%), and less than half (44%) were interested in using a regular bike. The gap between interest in e-assist bikes and regular bikes may indicate that physical effort is a deterrent to using regular bikeshare.
- When asked why they had not used the program, many of the respondents chose to leave an additional comment. Of these comments, most stated either physical limitations or just not having gotten the time to try it.
- Eighty percent (80%) of those that were interested said that they would consider using a bike or e-scooter for fun or to ride with friends and family. None of the other responses garnered more than 50% support, although getting to restaurants or entertainment and saving time and money compared to other transportation options were chosen by over 30% of interested non-users (see Figure 4).

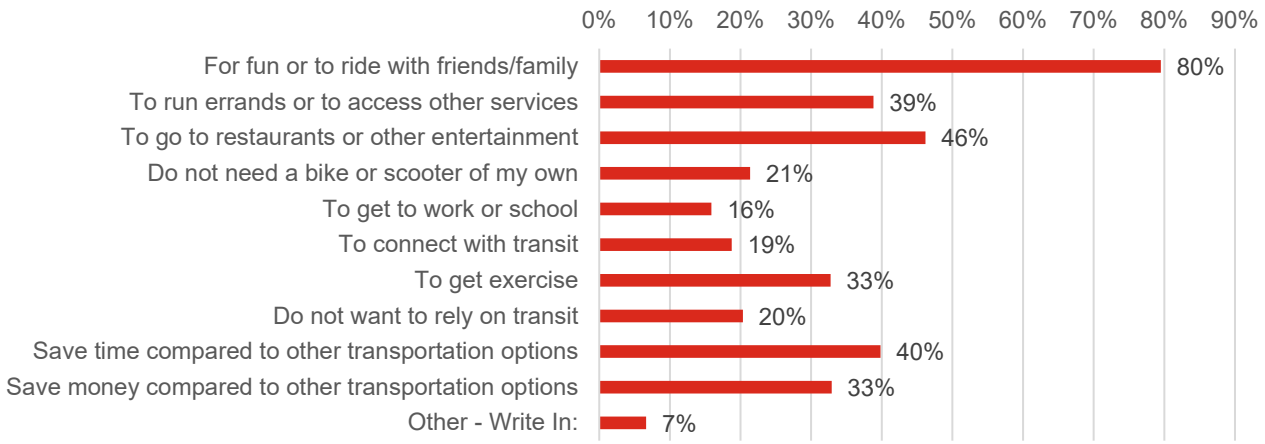

Figure 4: Reasons that non-users would consider using bike or e-scooter share.

COMMUNITY OPINION

The survey asked both users and non-users whether they viewed the program as an asset to the community and their thoughts on how and if it should continue (see Figure 5).

- Ninety-five percent (95%) of users thought that bike and e-scooter share was good for the community. Fifty-nine percent (59%) of non-users thought that the program was good for the community and 29% thought that it was not beneficial (12% responded that they did not know one way or another).
- Only 3% of respondents that used the program thought that there were too many vehicles, 48% thought that there were the right amount, 42% thought that there were too few, and 7% did not feel they knew enough to answer this question. Non-users were more likely to say that there were too many vehicles (23%), 28% felt there were the right amount, 17% felt there were too few, and 32% did not feel they knew enough to answer this question.
- Parking is often an issue identified by the public for bike and e-scooter share programs since they rely on users to park the vehicles in appropriate places. Non-users were more likely than users to think that parking behavior was an issue, with 40% saying that parking behavior was “poor” or “very poor” (compared to 7% of users); whereas 27% of non-users stated that parking behavior was “good” or “very good” (compared to 64% of users). The other respondents thought parking behavior was “OK”.
- The majority of both groups felt that Spokane should make the program permanent including 55% of non-users and 95% of users. However, there were also 30% of non-users that did not want the program to become permanent.
- Respondents were able to choose options for how they would change the program if it was to be made permanent or they could write in their own response.
    - For both users and non-users, the most common response was “more infrastructure to support riding bikes or e-scooters” (49% of users; 41% of non-users).
    - For users, the next most commonly selected improvement was to provide more e-scooters (49%).
    - For non-users, the next most commonly selected improvement was to improve bike parking behavior (31%).
    - Approximately 20% of users and 12% of non-users want there to be more e-assist bikes.
    - Over 40% of users and 20% of non-users would like to see more membership options.

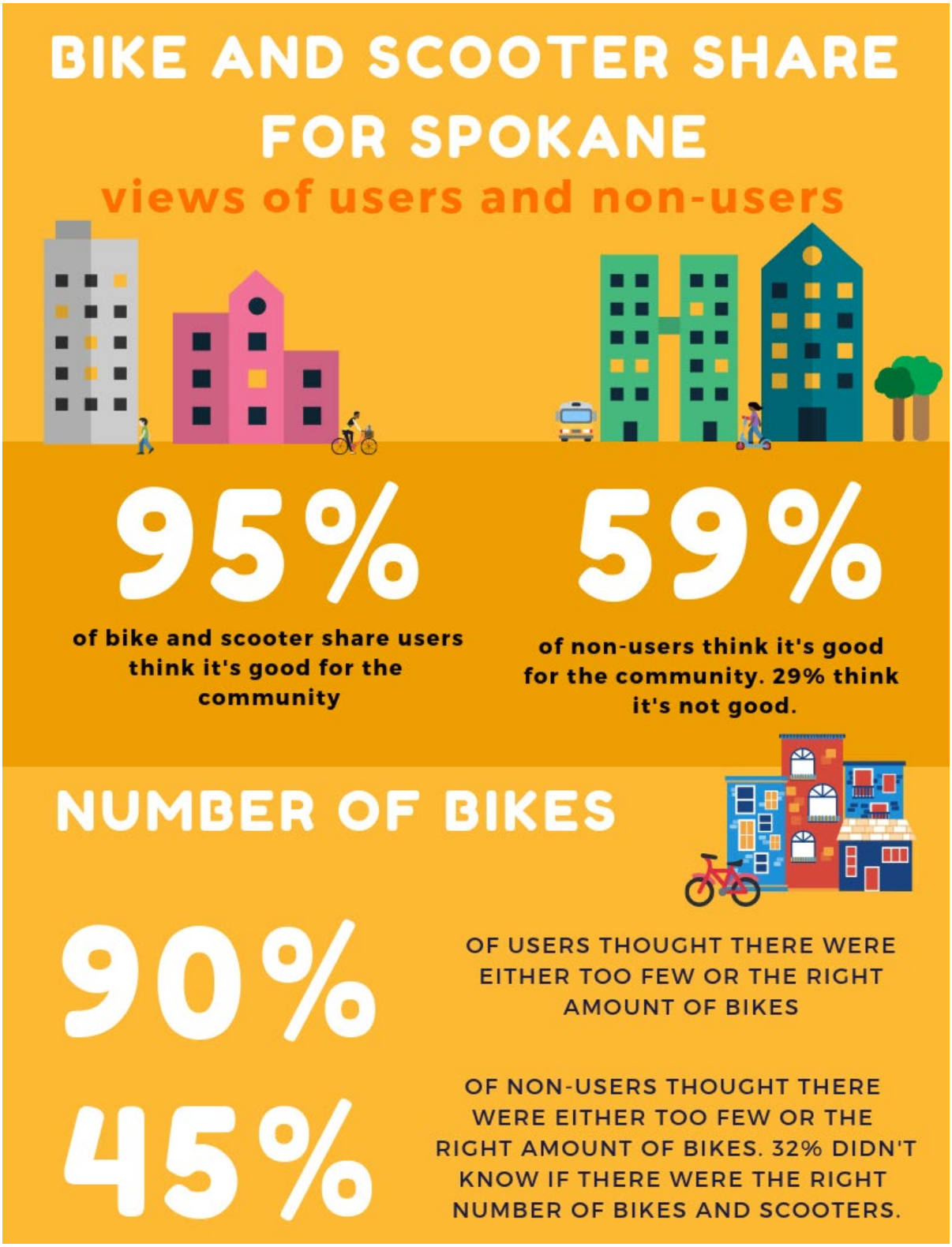

Figure 5: Summary of community opinion on shared mobility in Spokane.

WHO WE HEARD FROM

The following analysis compares respondent demographics to the City of Spokane to identify if any population groups were under-represented by the survey group.

- Approximately 91% of respondents were from Spokane County and 9% were from outside the County. Figure 8 shows that respondents were most heavily represented by zip codes 99201 and 99205 including Downtown Spokane, Browne's Addition, West Central, Emerson Garfield, and Northwest Spokane.
- Of the respondents who chose to answer, 49% identified as female, 50% identified as male, and 1% as other gender. This is slightly under-representative of women who make up 52% of Spokane's population.
- Figure 6 compares the age breakdown of survey respondents and City residents. People aged under 50 were over-represented in the survey and those 50 and older were under-represented. Note that a user must be at least 16 years old to ride a Lime bike or e-assist bike and 18 years old to ride an e-scooter.
- Figure 7 compares reported household income. Higher income households were over-represented amongst the survey respondents and lower income households were under-represented (e.g., 28% of Spokane households earn under $25,000 whereas only 14% of respondents were in this income bracket).
- Survey respondents were generally representative of the race and ethnicity breakdown in Spokane. Eight percent (8%) of survey respondents were non-White compared to 9% of residents. The only significantly under-represented racial or ethnic group in the survey was Black or African American (only 2% of survey respondents identified themselves as such compared to 5% of Spokane residents).
- Survey respondents were much more likely to have some post-high school education, approximately 90% compared to 60% of Spokane residents. This could be impacted by Gonzaga being included in the pilot program, however this should be noted for future outreach efforts.

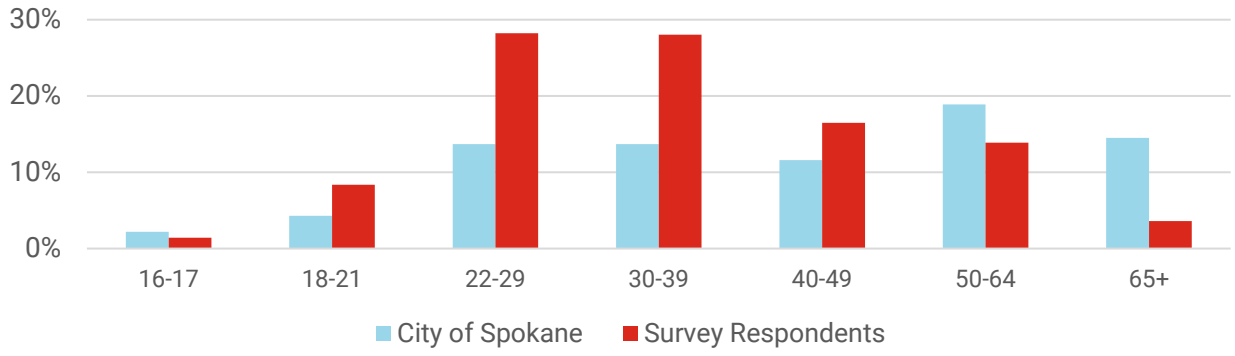

Figure 6: Comparison of age distribution of survey respondents and Spokane residents.

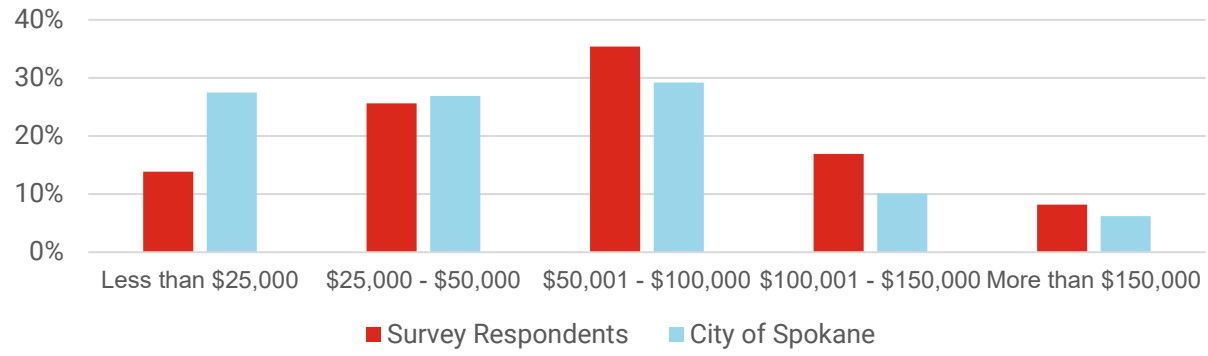

Figure 7: Comparison of household income of survey respondents and Spokane residents.

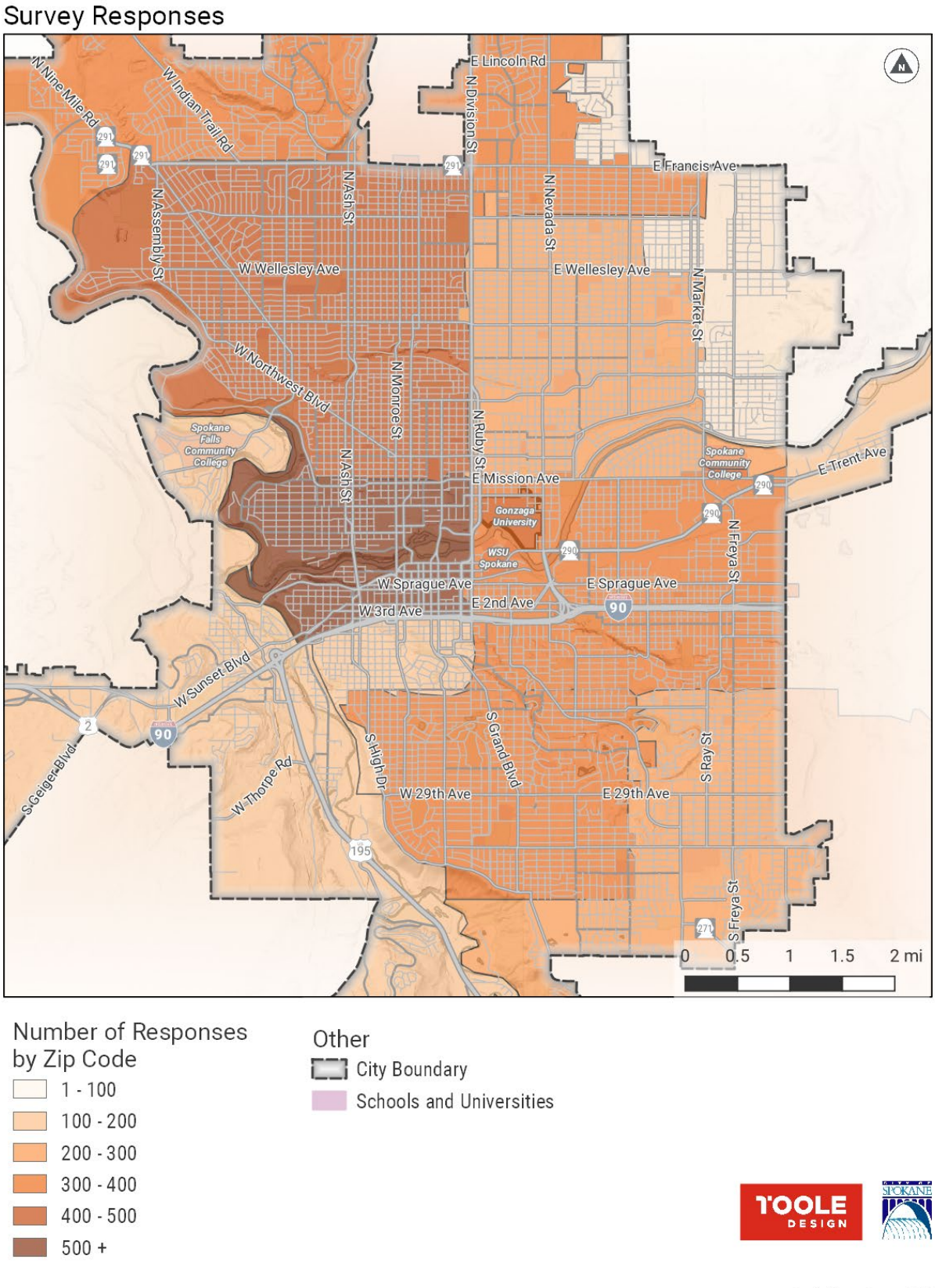

Figure 8: Zip codes of survey respondents in the Spokane area.

CHAPTER 3
FIELD EVALUATION

3. FIELD EVALUATION

Several sub-areas within Spokane were identified for field data collection to understand how the system is operating. The field surveys were conducted the week of October 22, 2018. The following areas were chosen based on land use variety, pilot program vehicle redistribution focus areas, and guidance from city staff: Downtown, Browne's Addition, and Kendall Yards.

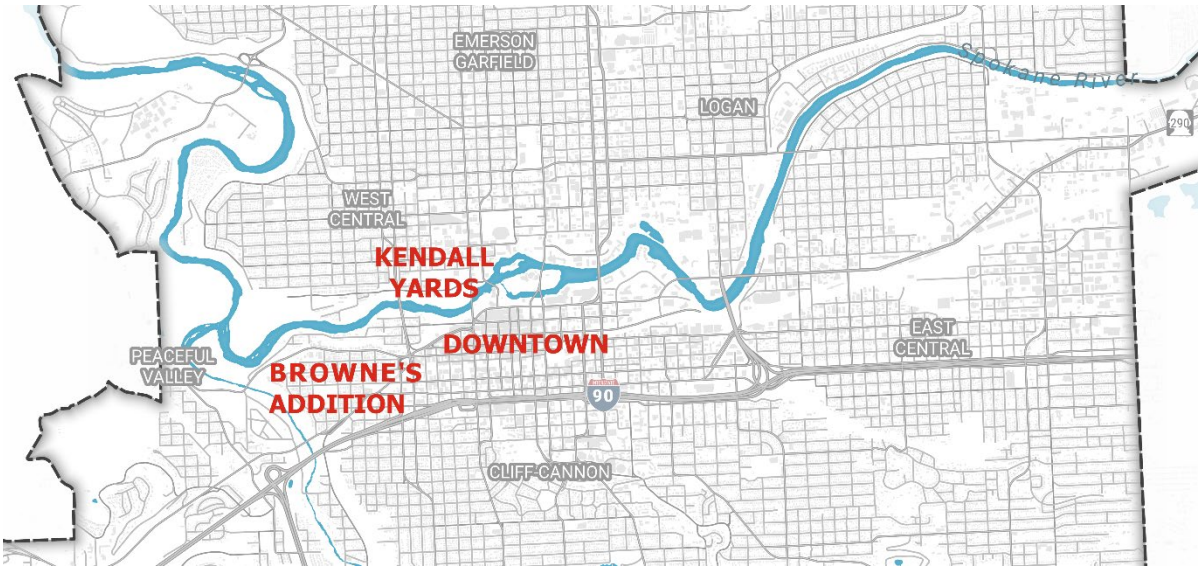

Figure 9: Sub-areas identified for field evaluation.

METHODOLOGY

The following methodology was used for field data collection:

1. Staff used a smart phone and the Lime app to identify the advertised location of the nearest bike or e-scooter in the study area. When the observer came to the "advertised" location of the bike in the app, they checked if that location was still showing in the app and logged its location. If they could not find the bike in the advertised location, they recorded it as "could not be found".

2. If the observer saw another bike or e-scooter along the way that was not identified in the app, they recorded the location of that bike or e-scooter and recorded the necessary field observations.

3. Once a bike or e-scooter was found, the observer recorded or assessed the following information:
    a. Presence of the vehicle in the Lime app,
    b. Ability to be reached and assessed by field staff,
    c. Unique identification code,
    d. Presence of Lime information (company name, phone number, and email address),
    e. Legibility of Lime information,
    f. Missing parts including:
        i. Seat,
        ii. Pedals,
        iii. Kick-stand,

iv. Handle grips,
v. Chain guard,
vi. Lock,
vii. Solar panel,
viii. Cables,
ix. Basket,
x. Front light,
xi. Front reflector,
xii. Back light,
xiii. Back reflector,
xiv. Fender,

g. Sufficient tire inflation (bikes and e-assist bikes only),
h. Functional brakes (bikes and e-assist bikes only),
i. Engaged wheel lock (bikes and e-assist bikes only),
j. Parking location (i.e., in the frontage zone, pedestrian zone, amenity zone, travel lane, off-street, or on private property),
k. Whether or not it was parked in a preferred parking area,
l. Whether or not it was parked upright,
m. Whether or not it was parked at a bike rack,
n. Whether or not it was obstructing access to key features (i.e., a doorway, pedestrian clear zone, driveway, curb ramp, bus stop, etc.), and
o. Other observations.

4. Field staff took photographs of all the bikes and e-scooters observed in the field to record their condition and parked location.

5. Once information for one bike or e-scooter was recorded, the observer used the app to search for the next nearest vehicle and the above process was repeated.

RESULTS

This study provided a snapshot of how the dockless pilot program operated in Spokane – focusing on the number, condition, and parking of vehicles in the system. A total of 95 vehicles including 83 e-scooters, 7 e-assist bikes, and 5 standard bikes were observed during the study. Table 1 shows the number of vehicles observed in each area and Figure 10 shows the specific location of these observations.

Table 1: Summary of Data Collection

	Downtown	Kendall Yards	Browne's Addition	Total
Number of E-Scooter Records	48	23	12	83
Number of E-Assist Bike Records	3	4	0	7
Number of Bike Records	1	4	0	5
Total	**52**	**31**	**12**	**95**

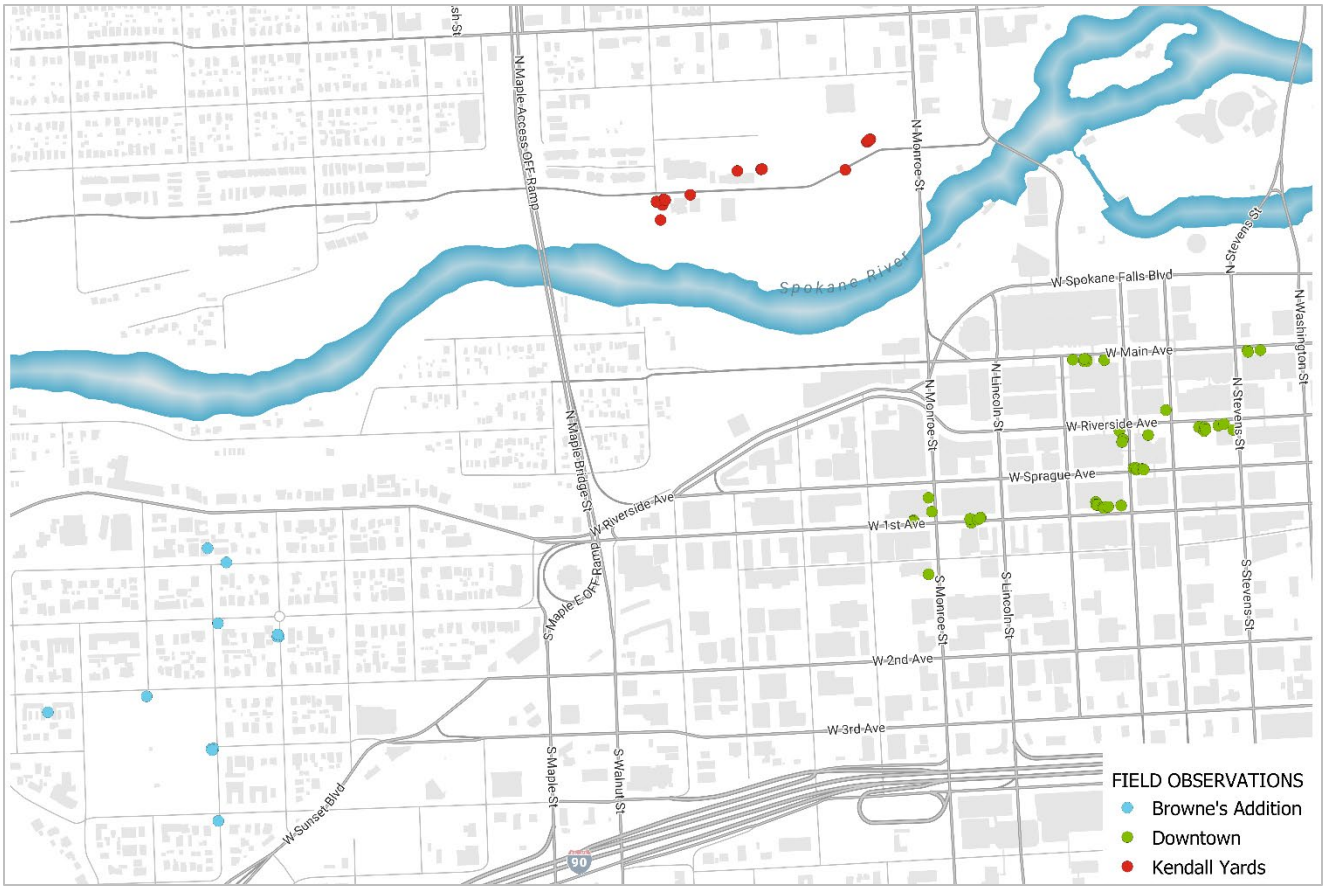

Figure 10: Field observation locations in Browne's Addition, Downtown, and Kendall Yards.

APP AND LOCATION ACCURACY

Lime vehicles observed in the field were compared to the locations shown in the app to calculate the following metrics:

- App Accuracy: 100% of vehicles showing in the Lime app were found in the field. This means that a user can have confidence that they will find a bike using the locations shown in the Lime app.
- Vehicle Surplus: 36% of the vehicles observed in the field did not have a corresponding point in the app, i.e., there were an extra number of vehicles found in the field not using the app. One reason that additional vehicles observed could not be found in the app is because of "clustering", which is when there are too many vehicles close together so the user cannot zoom in far enough to identify the vehicle in the app. This suggests that there could be 56% more vehicles in the field than are shown on the app.

EQUIPMENT CONDITION

Field staff recorded the condition of observed vehicles. This included taking an inventory of any missing parts, recording any visible defects, and assessing the functionality of the tires, brakes, and wheel lock for standard and e-assist bikes.[4] Photos were also taken by field staff to record other issues such as vandalism, scratches, and broken or damaged parts.

[4] Tires and brakes were tested by squeezing and nonfunctional brakes were noted if either brake lever could touch the handle grip. A wheel lock was considered engaged when it was completely closed and could not be slid open when tested by hand. For e-scooters, it was not possible to do an assessment of functioning brakes without unlocking and checking out the e-scooter, so that information was not collected.

This information is important as it could impact rideability and safety for users. There were six vehicles observed to have significant defects. These are shown in Table 2. The only other defect observed in the field was one e-scooter with a missing kick-stand shown in Figure 11.

Figure 11: An e-scooter missing its kick-stand parked leaning against a utility pole.

Table 2: Observed Vehicle Defects

Vehicle Type	Broken Tire	Insufficient Brakes	Missing Front Light	DEFECTIVE VEHICLES	% OF OBSERVED VEHICLES[5]
E-Scooters	1	n/a	-	1	1%
E-Assist Bikes	-	2	2	4	57%
Bikes	-	-	1	1	20%
Total	**1**	**2**	**3**	**6**	**6%**

PARKING BEHAVIORS AND LOCATION

Parking behavior, parking location, and obstructions caused by parked bikes were recorded in the field and are summarized in Table 3. Approximately 98% of vehicles observed were parked upright. Approximately 96% of vehicles were parked in a "preferred parking area", which is defined as the amenity zone (the space between the sidewalk and the curb) or the frontage zone (the space between the building face and the curb) and not blocking pedestrian access.

[5] These results should not be considered statistically significant because: (a) brakes could not be tested on e-scooters; and (b) the sample size of bikes and e-bikes observed in the field is too small.

All of the bikes and e-bikes observed were parked in a preferred location (although the sample size was small). However, only 89% of e-scooters met this criteria, meaning that approximately 11% of e-scooters are parked in a non-preferred location.

Approximately 5% of parked vehicles caused some sort of obstruction (see Table 4). This included one bike blocking a dumpster and five bikes blocking the pedestrian zone and reducing it to less than four feet of clearance, which is narrower than the required minimum ADA standards.

Table 3: Parking Behaviors Observed in the Field

Vehicle Type	Parking Behavior	Downtown		Kendall Yards		Browne's Addition		Total	
		Yes	No	Yes	No	Yes	No	Yes	No
E-Scooters	Parked in Preferred Parking Area	100%	0%	74%	26%	75%	25%	89%	11%
	Parked Upright	94%	6%	100%	0%	92%	8%	95%	5%
E-Assist Bikes	Parked in Preferred Parking Area	100%	0%	100%	0%	*No E-Assist Bikes in Browne's Addition*		100%	0%
	Parked Upright	100%	0%	100%	0%			100%	0%
Bikes	Parked in Preferred Parking Area	100%	0%	100%	0%	*No Bikes in Browne's Addition*		100%	0%
	Parked Upright	100%	0%	100%	0%			100%	0%
All Vehicles	**Parked in Preferred Parking Area**	**100%**	**0%**	**91%**	**9%**	**75%**	**25%**	**96%**	**4%**
	Parked Upright	**98%**	**2%**	**100%**	**0%**	**92%**	**8%**	**98%**	**2%**

Table 4: Parking Obstructions Observed in the Field

Vehicle Type	Obstruction	Number of Incidences	% of Observed Vehicles
E-Scooter	Dumpster	1	1%
	Pedestrian Clear Zone	4	5%
E-Assist Bikes	No Obstructions Observed		
Bikes	No Obstructions Observed		

Figure 13: Left: Bike parked fully in the sidewalk frontage zone. Right: Scooters in the foreground parked partially in the pedestrian zone and scooters in the background parked fully in the sidewalk frontage zone.

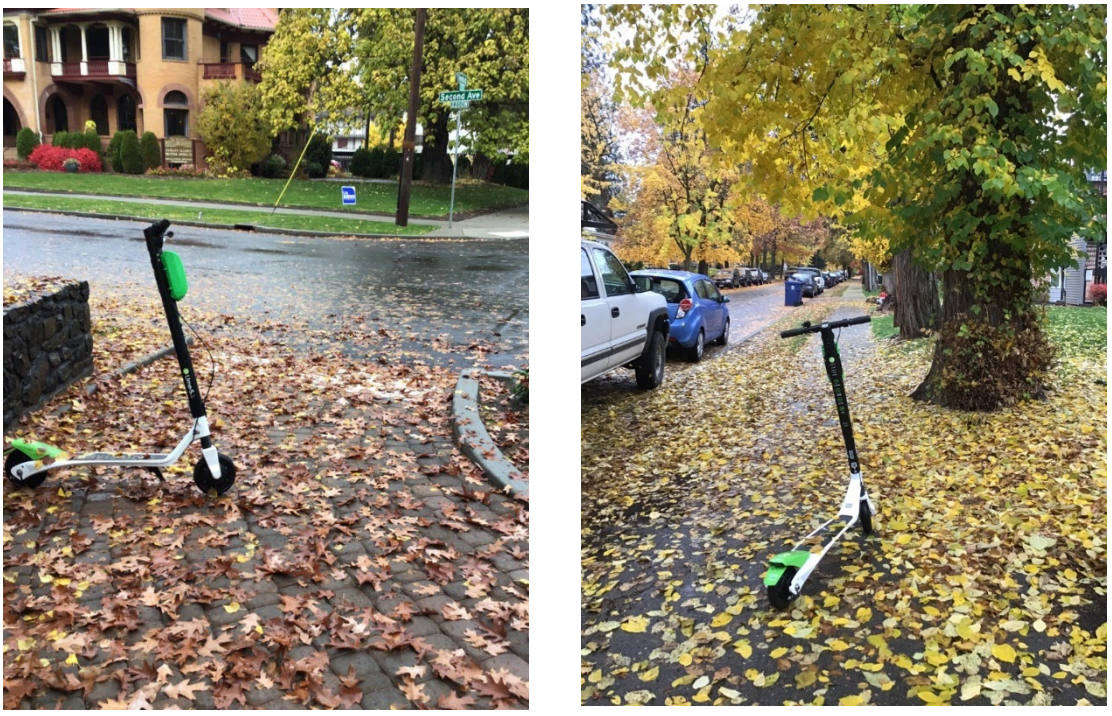

Figure 12: Left: Scooter parked partially in the pedestrian zone. Right: Scooter in the foreground parked blocking the pedestrian zone.

CHAPTER 4
RIDERSHIP ANALYSIS

4. RIDERSHIP ANALYSIS

The pilot program was evaluated to review ridership trends, usage rates, and spatial trip patterns. Ridership data was provided by Lime for the 74-day period of the pilot program from September 4, 2018 to November 16, 2018. However, vehicle availability was only consistently available from October 10, 2018 to November 16, 2018 and as such any analysis including vehicle availability focuses on this 38-day period.

METHODOLOGY

For each trip taken during the 74-day period between September 4, 2018 and November 16, 2018, the following information was provided:

- Trip ID number,
- Trip start date and time,
- Trip end date and time,
- Trip start latitude and longitude,
- Trip end latitude and longitude,
- Trip distance,
- Trip duration,
- Vehicle ID number, and
- Device ID number.

The data was cleaned to remove any unusual trips including:

- Trip durations under 30 seconds: these trips are very short in duration and are likely aborted trips that could have been terminated because of a mechanical issue, a decision not to take the trip, or another reason.
- Average speeds over 20 miles per hour: these are not realistic trip speeds and are likely when a bike was being transported in a vehicle, bus, or train.
- Both the origin-destination distance and the total traveled distance are under 150-feet: these are very short trips that are unlikely to have any utility. Trips where both the distance between the origin and destination was small, but where the total distance travelled was over 150-feet were kept because some trips could have been round trips where the origin and the destination are the same general location. Some trips that were removed had very small reported total travel distances despite occurring between origins and destinations separated by more than that distance. These may have been recording errors by the equipment.

Out of the 146,051 trip records provided by Lime, a total of 10,179 trips (6.9%) were removed from the dataset resulting in a total of 135,872 trips taken during the pilot period.

For the remaining valid trips, the start and end point locations were assigned to a hexagonal grid. Assigning these trips to grids was useful as it allowed the project team more efficiently analyze these aggregated values rather than discrete points, and because the size of the grid removed potential imprecision in the GPS readings.

The following sections analyze this data in more detail.

RESULTS

TOTAL TRIPS

For the 74-day period from September 4, 2018 to November 16, 2018, there were 135,872 trips taken including 108,360 e-scooter trips, 18,831 e-assist bike trips, and 8,681 regular bike trips. Figure 14 shows the fluctuation of these trips and shows that the peak use occurred on October 27, 2018 when approximately 3,947 trips were taken.

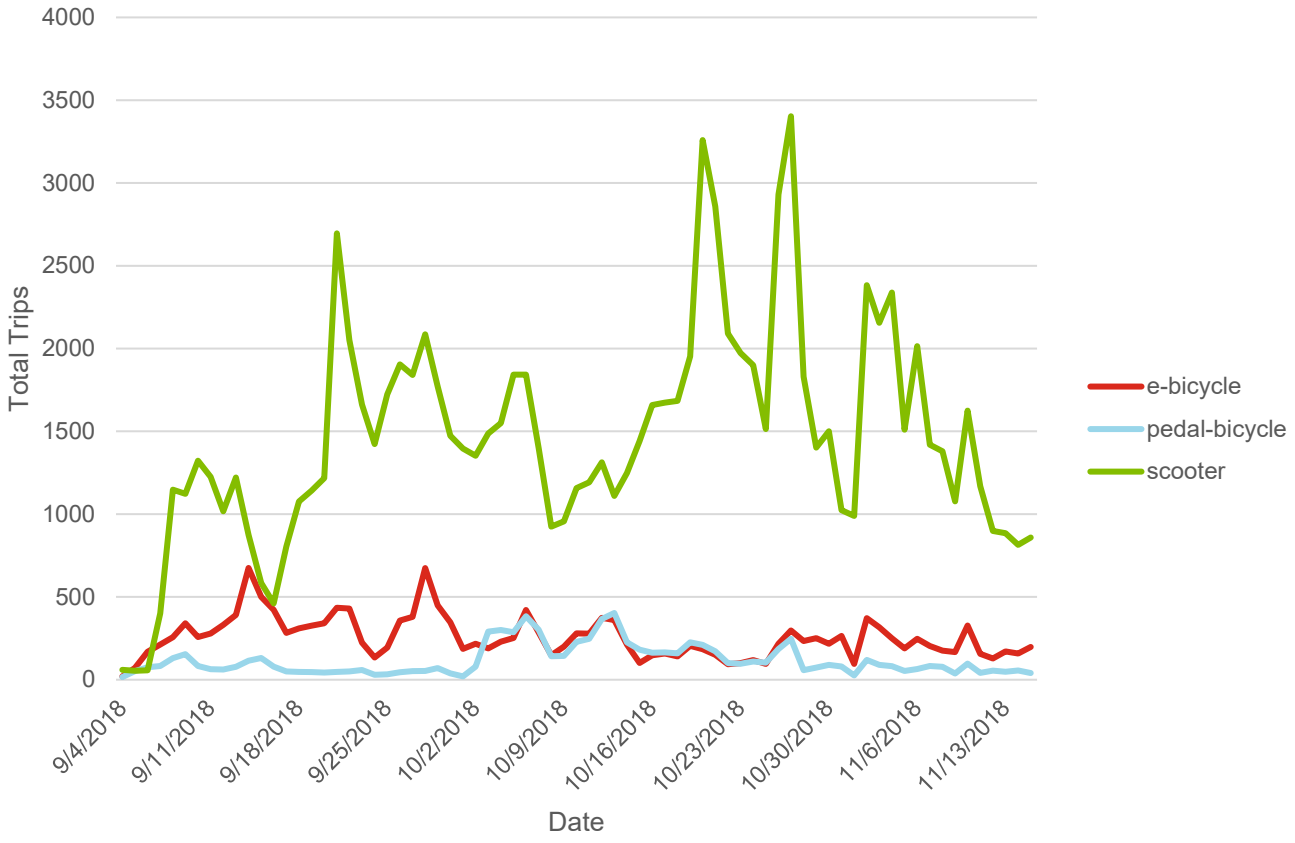

Figure 14: Daily ridership of the Spokane shared mobility pilot program.

VEHICLE AVAILABILITY

Vehicle availability data was only consistently available for the 38-day period from October 10, 2018 to November 16, 2018. During this period there were an average of 425 scooters, 72 e-assist bicycles, and 53 pedal bicycles available to the public.

The number of vehicles available varied throughout the pilot period, with some dramatic fluctuations, as shown in Figure 15. For example, the number of scooters increased rapidly in the first week of the program, reduced sharply for a day, then reduced steadily into mid-October before rapidly increasing to 600 scooters in mid-October. There was another very sharp decline in early November before returning to over 500 scooters and another sharp decline to 400 scooters to finish the pilot program.

The number of regular and e-bikes did not have such dramatic fluctuations. It is noted that prior to October 9 there was an error with Lime data where the number of regular and e-assist bikes was not available and that time

period was not included in the evaluation. There were almost 100 regular bikes in early October and then declined gradually for the remainder of the pilot. The number of e-bikes generally increased over the course of the pilot program. The fluctuations in vehicle availability could be from vehicles being removed from circulation, from recording errors with the equipment, or other reasons, which would need to be confirmed with Lime.

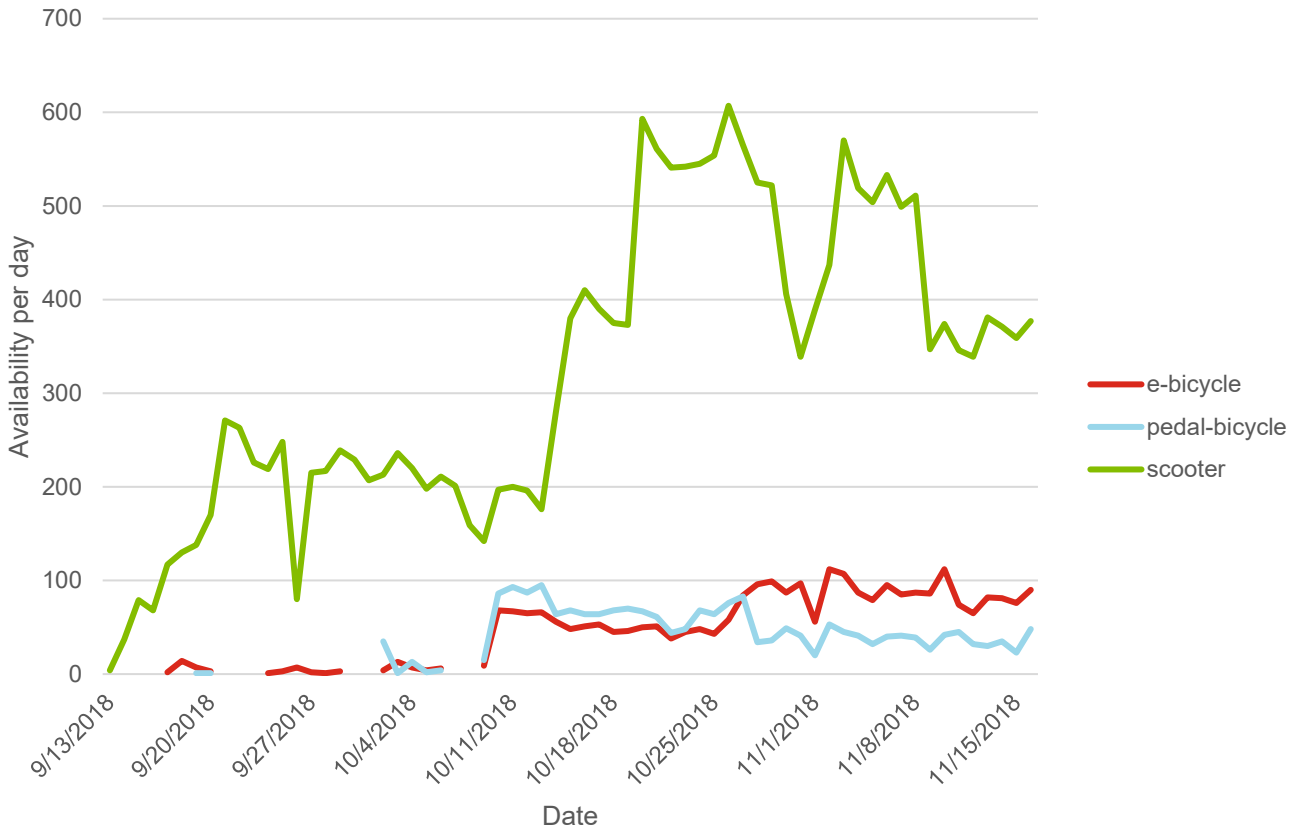

Figure 15: Daily vehicle availability during the Spokane shared mobility pilot program. Note that there was an error with Lime data prior to October 9 where the number of regular and e-assist bikes was not available.

TRIPS PER VEHICLE PER DAY

A common metric to evaluate utilization is the number of trips per vehicle per day. The average utilization for the 38-day period where vehicle data was available was 3.1 trips per vehicle per day (all vehicle types combined).[6] This represented:

- 3.9 trips per vehicle per day for scooters,
- 2.9 trips per vehicle per day for e-assist bikes, and
- 2.4 trips per vehicle per day for regular bikes.

The change in vehicle utilization during the pilot program is shown on Figure 16. In general, utilization started high and then gradually reduced and levelled out towards the end of the pilot program. Figure 17 shows how total vehicle availability and utilization compared during the pilot program. In general, as availability increased and levelled out, utilization reduced and levelled out.

[6] Because bike and e-bike availability was not available up to and including October 9, 2018, only data from October 10 to November 16, 2018 was used for this analysis.

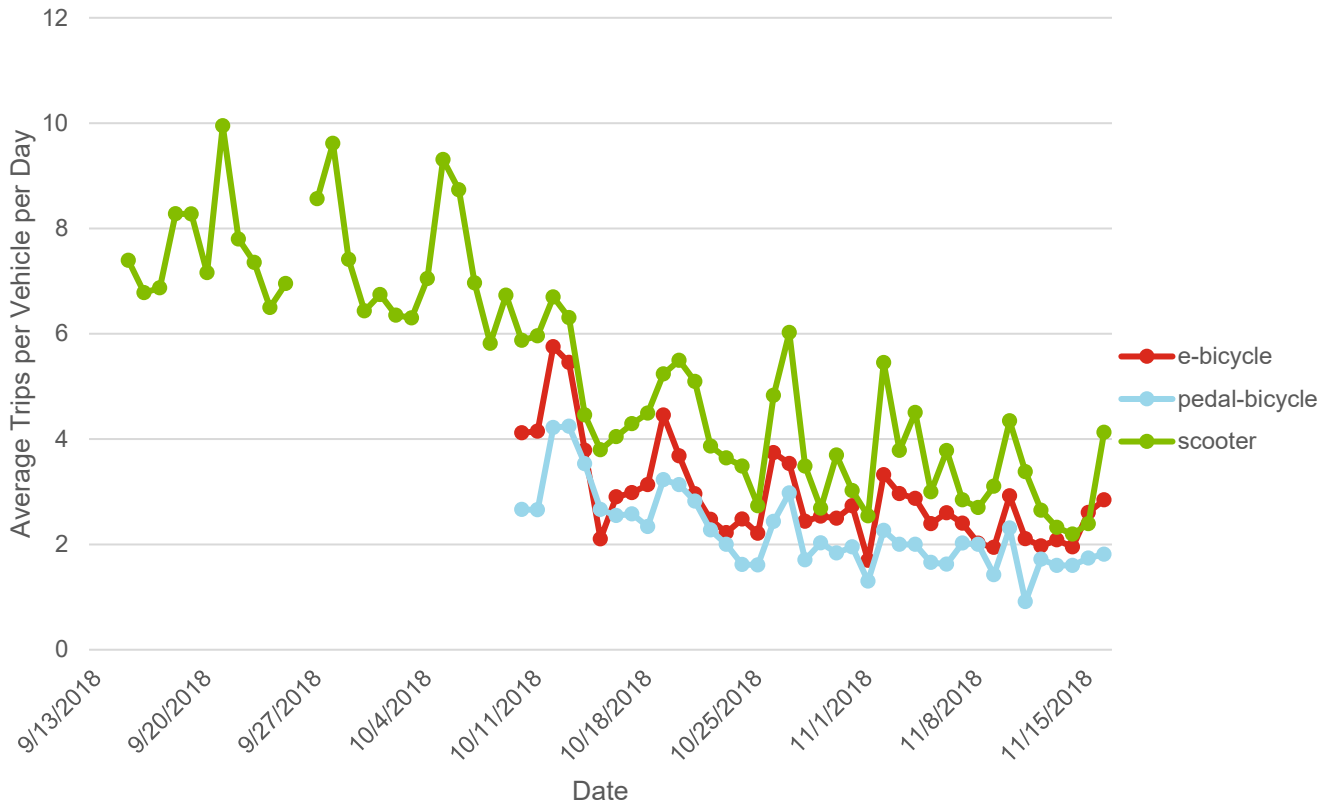

Figure 16: Vehicle utilization during the Spokane shared mobility pilot program.

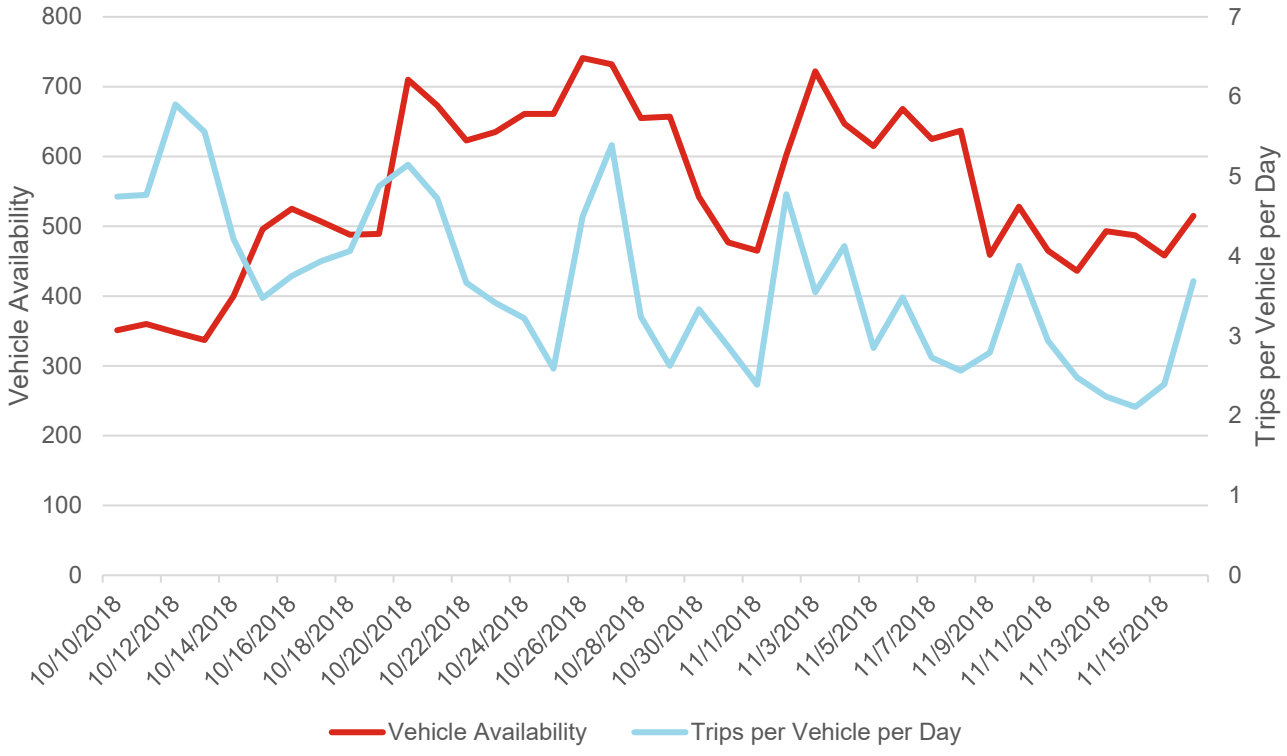

Figure 17: Comparison of vehicle availability and utilization during the Spokane shared mobility pilot program.

PATTERNS BY TIME OF DAY, DAY OF WEEK

Figure 18 shows the distribution of trips taken during the 74-day pilot program by day of the week. In Spokane, ridership is higher on Fridays and Saturdays than any other day during the week. Nevertheless, Friday, Saturday, and Sunday use is at most only 29% higher than the Monday to Thursday average, which suggests that there is a mix of utilitarian and recreational riders.

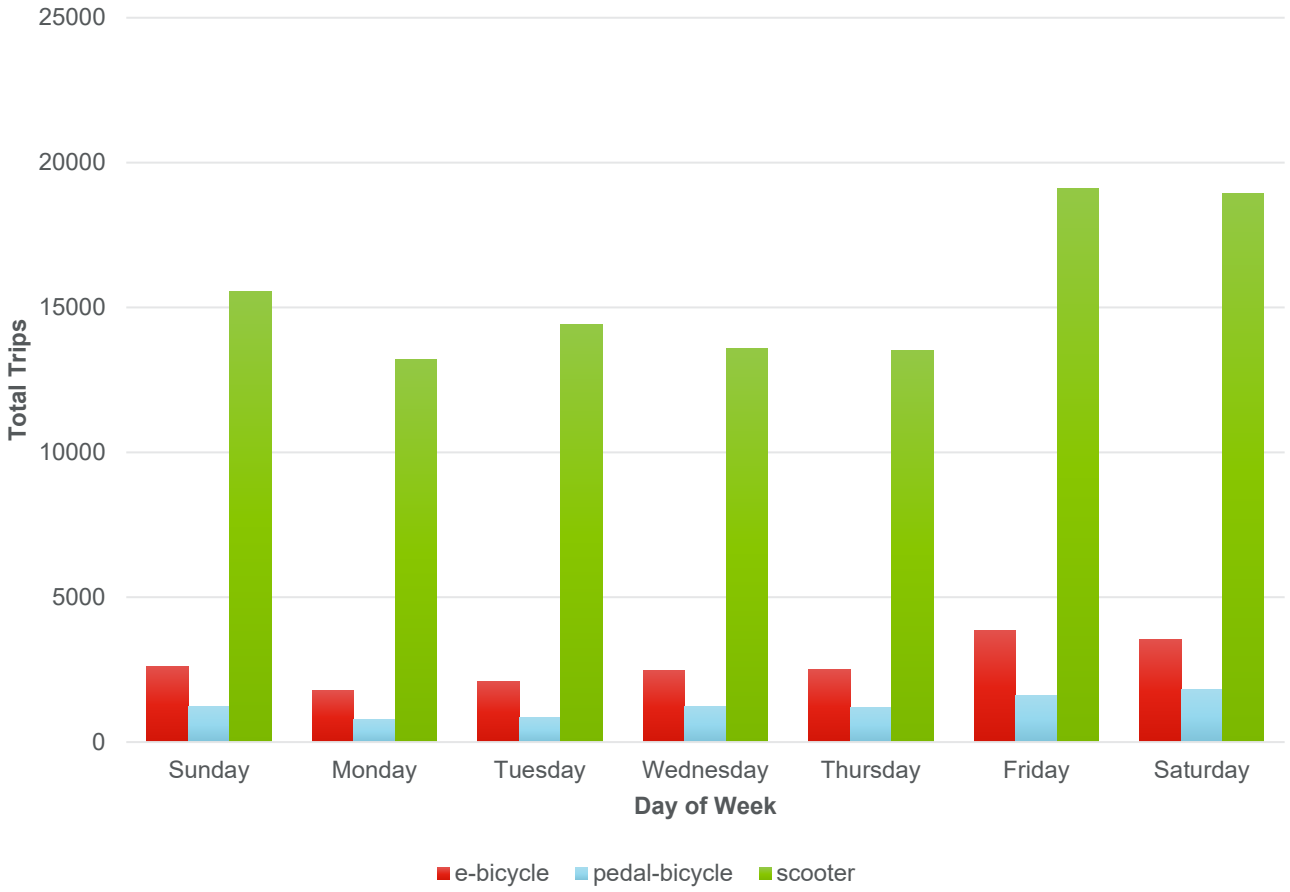

Figure 18: Trips by mode and day of the week.

As shown in Figure 19, weekday ridership increases throughout the morning before peaking at noon and then declining for the rest of the day. A typical “commuter” profile has two peaks, one around 7:00 AM to 8:00 AM and another around 5:00 PM to 6:00 PM. This is not the case for weekday ridership in Spokane where trip-making around mid-morning, midday, and early afternoon are highest, suggesting there could be used for recreational rides, visitor trip-making, running errands, attending meetings, and going to lunch during the day.

Figure 20 is at the same scale and shows that weekend ridership is generally higher and increases through the morning peak between 10:00 AM and 11:00 AM before ridership decreases across the rest of the day. This is likely representative of less utilitarian riding for trips such as recreational rides, going to coffee or brunch, and visiting friends or family.

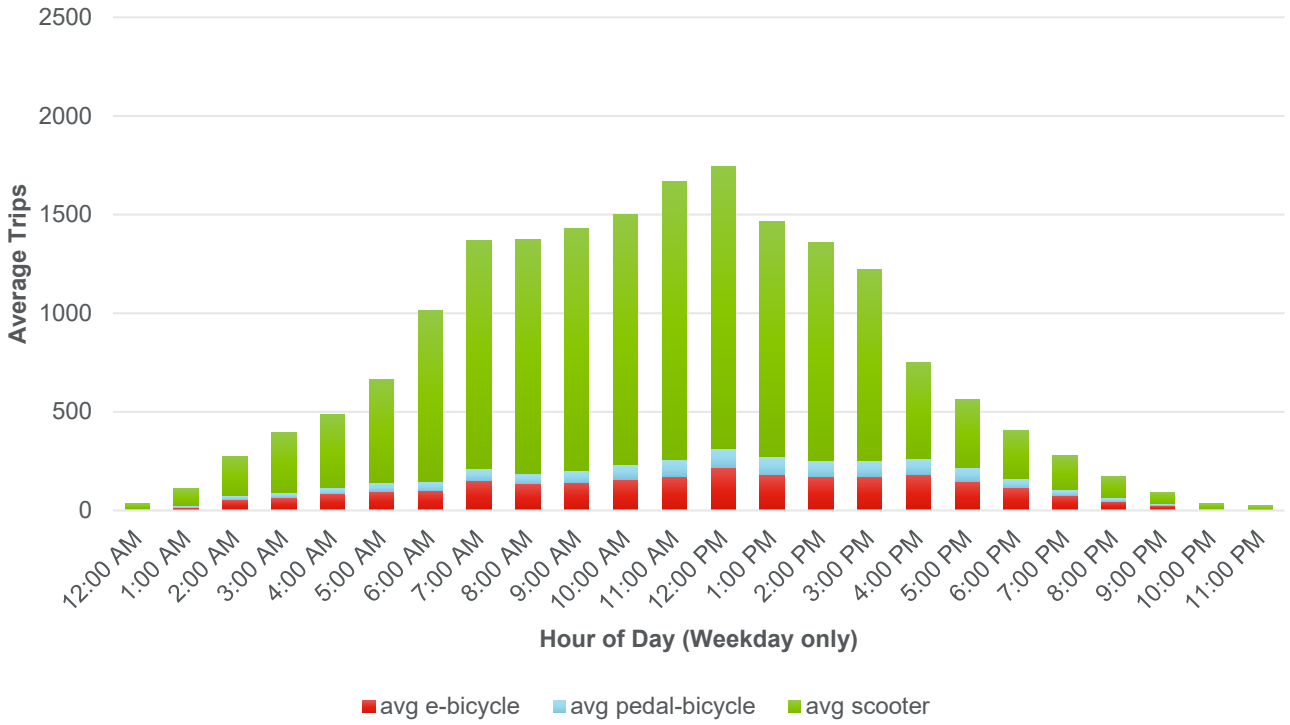

Figure 19: Trips by hour of the day (average weekday).

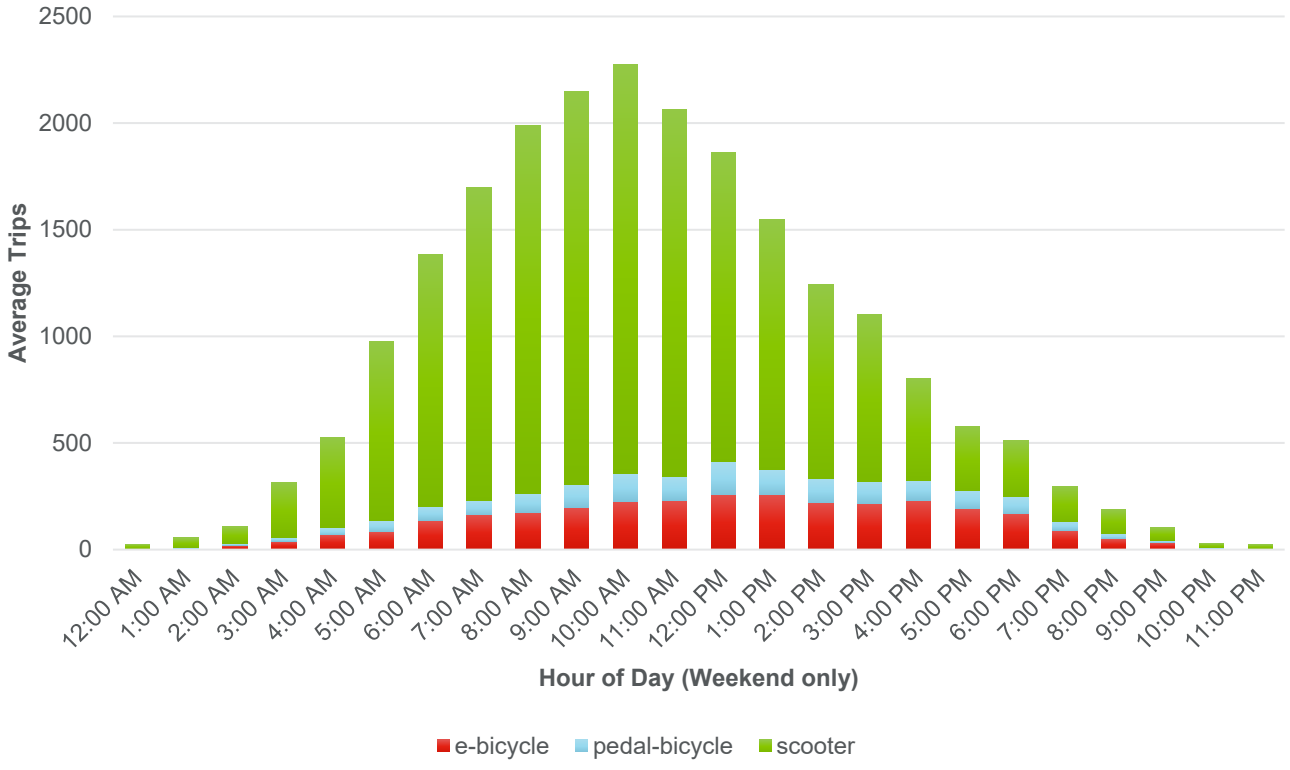

Figure 20: Trips by hour of the day (average weekend day).

TRIP DURATION

Figure 21 plots the frequency of different duration trips and shows that nearly all trips are under 1 hour (approximately 96%), 76% are less than 20 minutes long, and 55% are less than 10 minutes. In fact, 42% of the trips taken were between 4 and 10 minutes long, which represents a bicycling distance of approximately 0.5 to 1.0 miles.

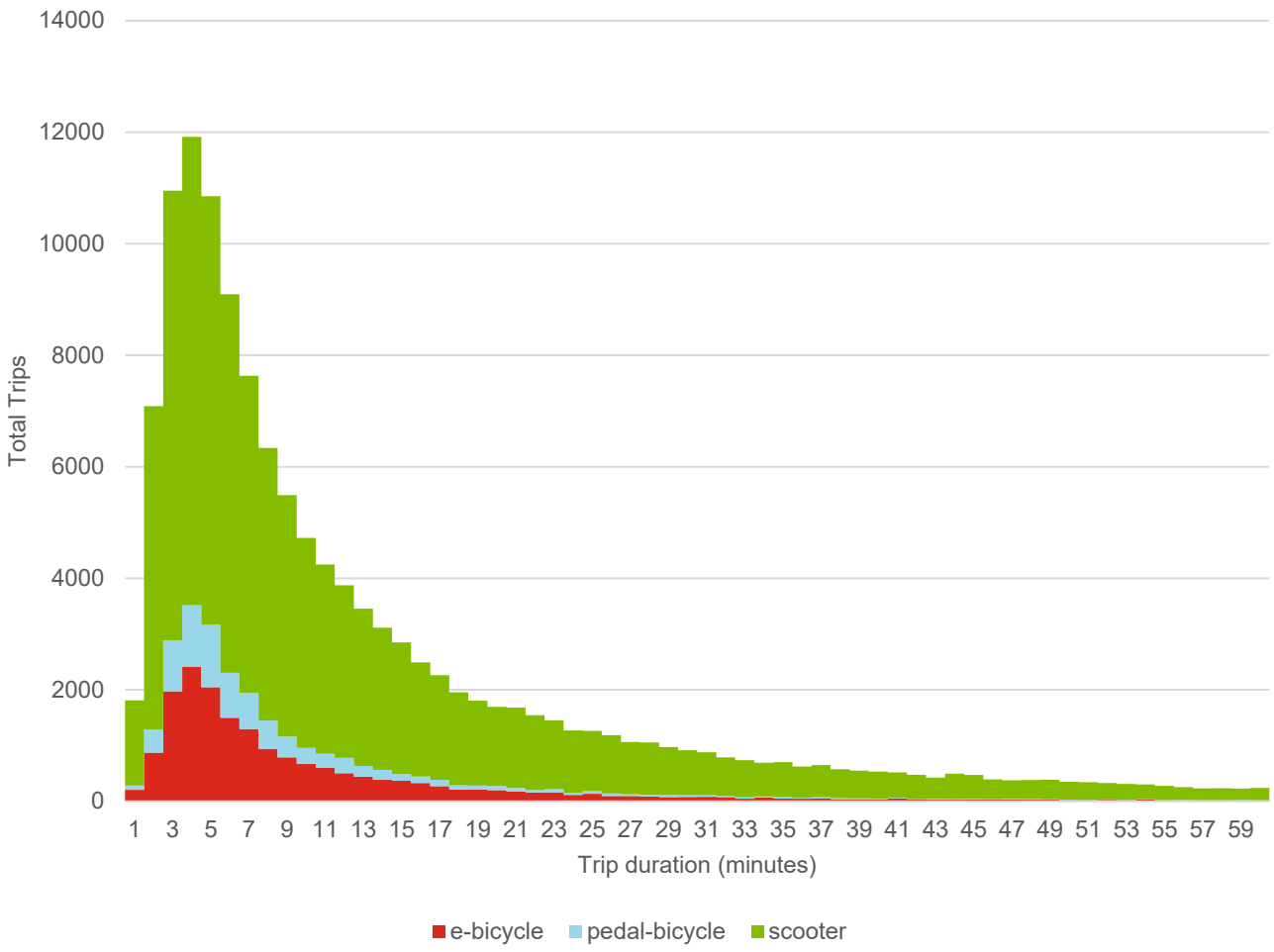

Figure 21: Trip Duration (Minutes)

TRIP DISTANCE

The frequency of trips by distance is included on Figure 22 and shows that the majority of trips are less than 3 miles (93%), 86% are less than 2 miles, and 69% are less than 1 mile. Trips less than half a mile represent approximately 45% of trips and trip distances between 0.5 and 1.0 miles represent approximately 27% of trips.

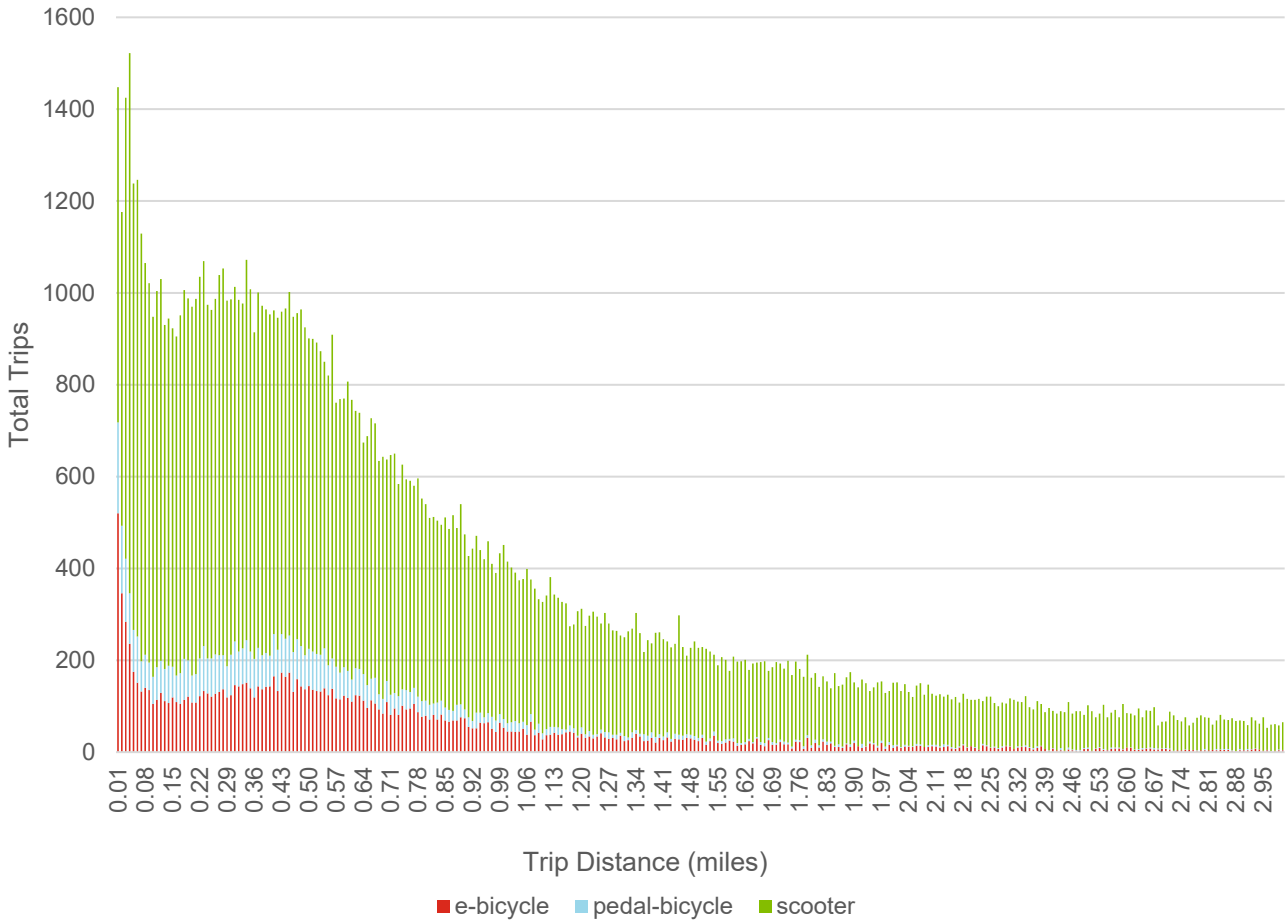

Figure 22: Trip Distance (miles).

SPATIAL PATTERNS

The 135,872 trips taken in Spokane during the 74-day pilot program were plotted on Figure 23 to view spatial patterns of the most popular routes taken. To get a measure of trip activity, all of the start and end points of these trips were assigned to a hexagonal grid and plotted on Figure 24. For the 135,872 trips, there are 271,744 trip origins and destinations (also referred to as “trip ends”). Over the pilot period, some of the more popular origins and destinations were:

- The Downtown Core (defined as the area south of the Spokane River, north of Sprague Avenue, and between N Lincoln Street and N Bernard Street): 69,724 trip ends were recorded in this area, i.e., the number of trips that started in the Downtown Core plus the number of trips that ended in the Downtown Core (and for round trips that started and ended in the Downtown Core, both the origin and the destination are included in this number). This represents approximately 26% of all trip activity,
- Gonzaga University: 32,634 trip ends were recorded, representing 12% of all trip activity (a map of just trips that started or ended at Gonzaga University is shown in Figure 25), and
- Kendall Yards: 10,348 trip ends were recorded, representing 4% of all trip activity.

Overall, most trips started or ended within the central city and locations where Lime focused their vehicle distribution. Outside the central city, Manito Park and South Perry District also had relatively high trip numbers. The north-south arterials Monroe Street and Division Street were amongst the most popular routes.

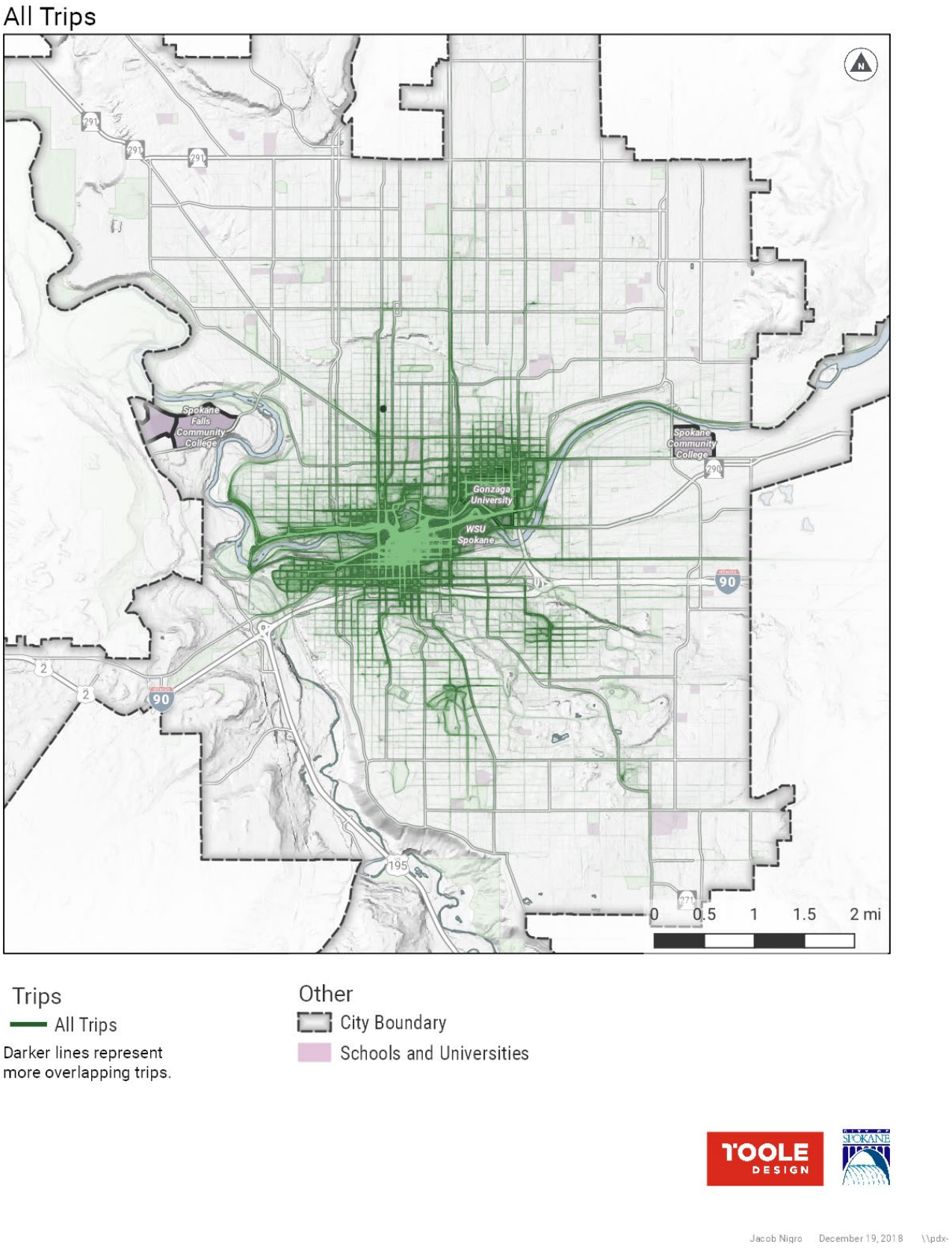

Figure 23: Routes taken during shared mobility pilot program, all vehicle types.

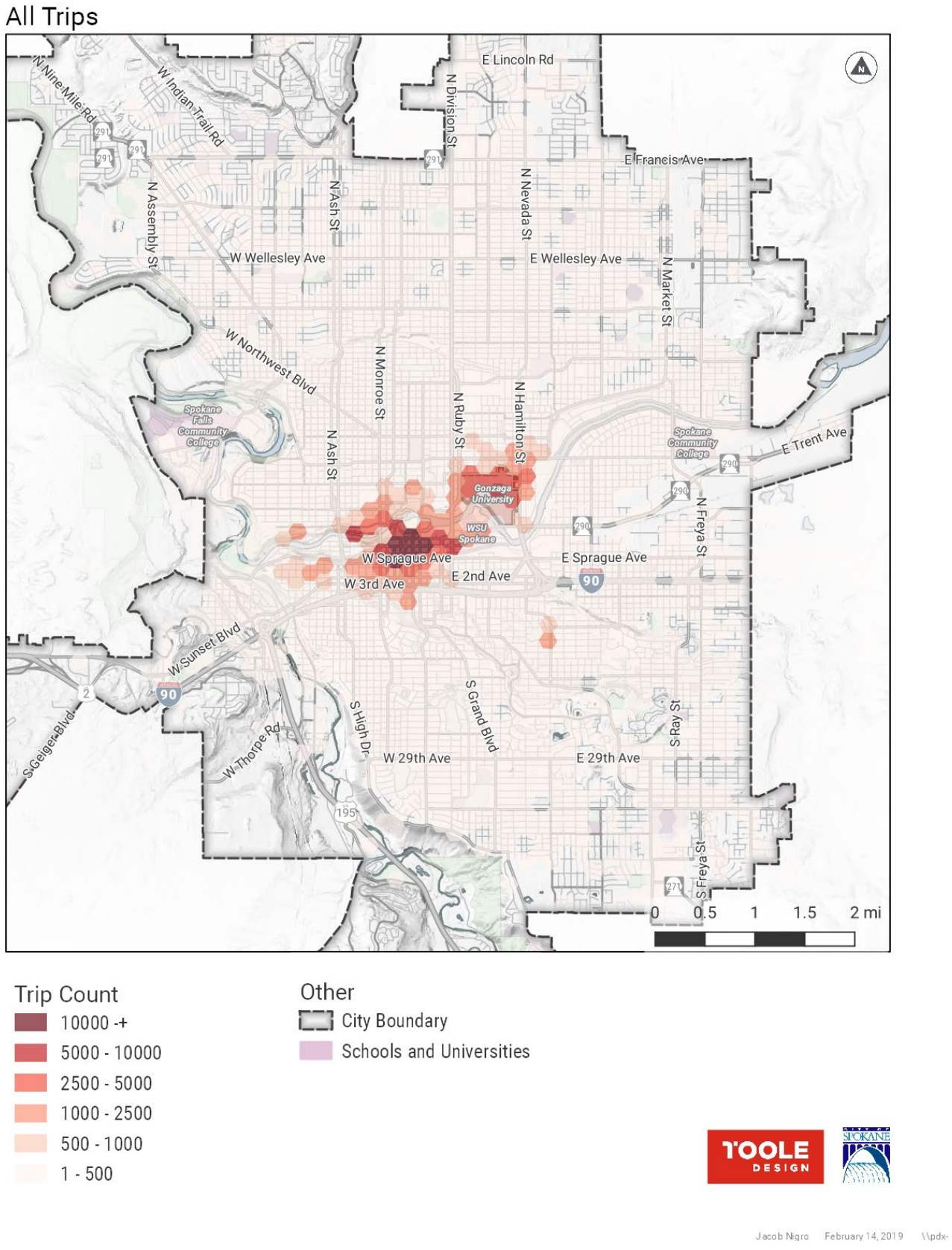

Figure 24: Heat map of shared mobility trip densities (number of trips starting and/or ending in each area).

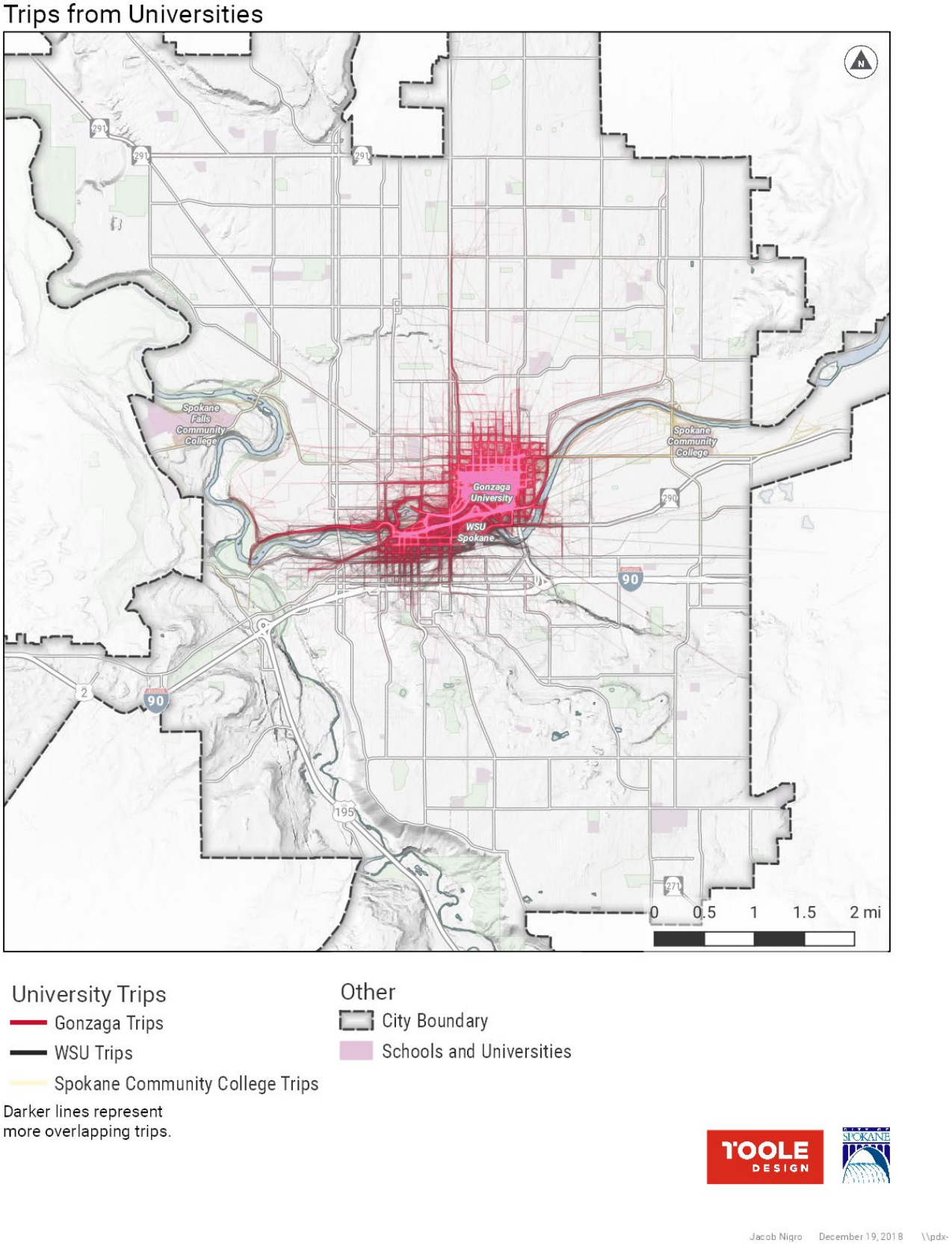

Figure 25: Routes taken by shared mobility trips starting and/or ending at colleges and universities.

VEHICLE DISTRIBUTION

An analysis was conducted to show how the vehicles were distributed during the pilot program. Figure 26 shows the percentage of the pilot program that a vehicle was available in each hexagonal area. It shows that vehicles were regularly available in the inner core areas of the city. Vehicles were available nearly 80% of time in most of the Downtown, in and around Gonzaga University, at Kendall Yards, near Providence Sacred Heart Children's Hospital, and in Browne's Addition. Vehicles were available 60%-80% of the time in the Perry District and around the intersection of Monroe Street and Indiana Avenue.

Outside of the inner core, vehicles were available much less frequently with most areas having a vehicle available less than 20% of the time. This suggests that the program, either naturally or through intervention, balanced itself towards areas of high demand. It is uncertain, but some areas may have seen higher ridership if vehicles were more frequently rebalanced to areas outside of the inner core.

EQUITY ANALYSIS

An equitable shared mobility system provides a high quality of service to all populations and parts of the city.[7] To date, shared mobility vehicles in U.S. cities are disproportionately located in higher-income, predominantly white neighborhoods and their members tend to have a higher representation of wealthier, Caucasian, and higher-educated populations than the cities these programs serve.[8] Low-income neighborhoods consistently have the sparsest density of bikeshare stations or shared mobility vehicles reducing their utility as a transportation option to the people living in these areas.[9] Further, disparate investment in bicycling infrastructure and programs in low-income areas exacerbate low ridership and restrict the pool of riders to only the most confident bicyclists.[10]

Shared mobility can serve as an important connection to jobs, services, and transit; and dockless systems can help overcome many of the traditional system limitations of unequal station distribution, program access, and entry cost to help encourage higher participation from low-income and traditionally underserved communities.

System activity (Figure 27) and vehicle distribution (Figure 28) were analyzed to determine the number of trip ends and distribution of vehicles in traditionally underserved areas of the city. These areas were defined as areas where the household income is under the city-wide average median household income ($52,929) and the percentage of people of color and Hispanic populations is greater than the city-wide average (12.3%).

System activity looks at the number of trips that started or ended in an equity area. For the 135,872 trips taken throughout the city during the 74-day pilot period, there were 271,744 trip origins and destinations (also referred to as "trip ends"). A total of 63,435 trip ends were recorded in equity areas (i.e., the trip either started or ended in an equity area or for round trips both the origin and the destination were counted). This represents approximately 23% of all trip activity. On average, equity areas observed an average activity level of 155 trip ends during the pilot period, approximately 8% higher than the city-wide average of 143 trip ends.

Figure 28 shows that on average a vehicle was available approximately 28% of the time in the identified equity areas, compared to 17% of the time in "non-equity" areas and 20% of the time throughout the city.

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[7] High station density requires approximately 28 stations per square mile to ensure a five-minute walk between stations. For more information, see: National Association of City Transportation Officials (NACTO). 2015. "Walkable Station Spacing is Key to Successful, Equitable Bike Share." https://nacto.org/wp-content/uploads/2015/09/NACTO_Walkable-Station-Spacing-Is-Key-For-Bike-Share_Sc.pdf.

[8] Ursaki, J. 2015. "Quantifying the Equity of Bikeshare in US Cities." University of Vermont Transportation Research Center. http://chi.streetsblog.org/wp-content/uploads/sites/4/2016/03/Bikeshare_TRB_submission.pdf.

[9] NACTO. 2015, p.1.

[10] Geller, R. 2009. "Four Types of Cyclists." https://nacto.org/wp-content/uploads/2015/09/NACTO_Walkable-Station-Spacing-Is -Key-For-Bike-Share_Sc.pdf.

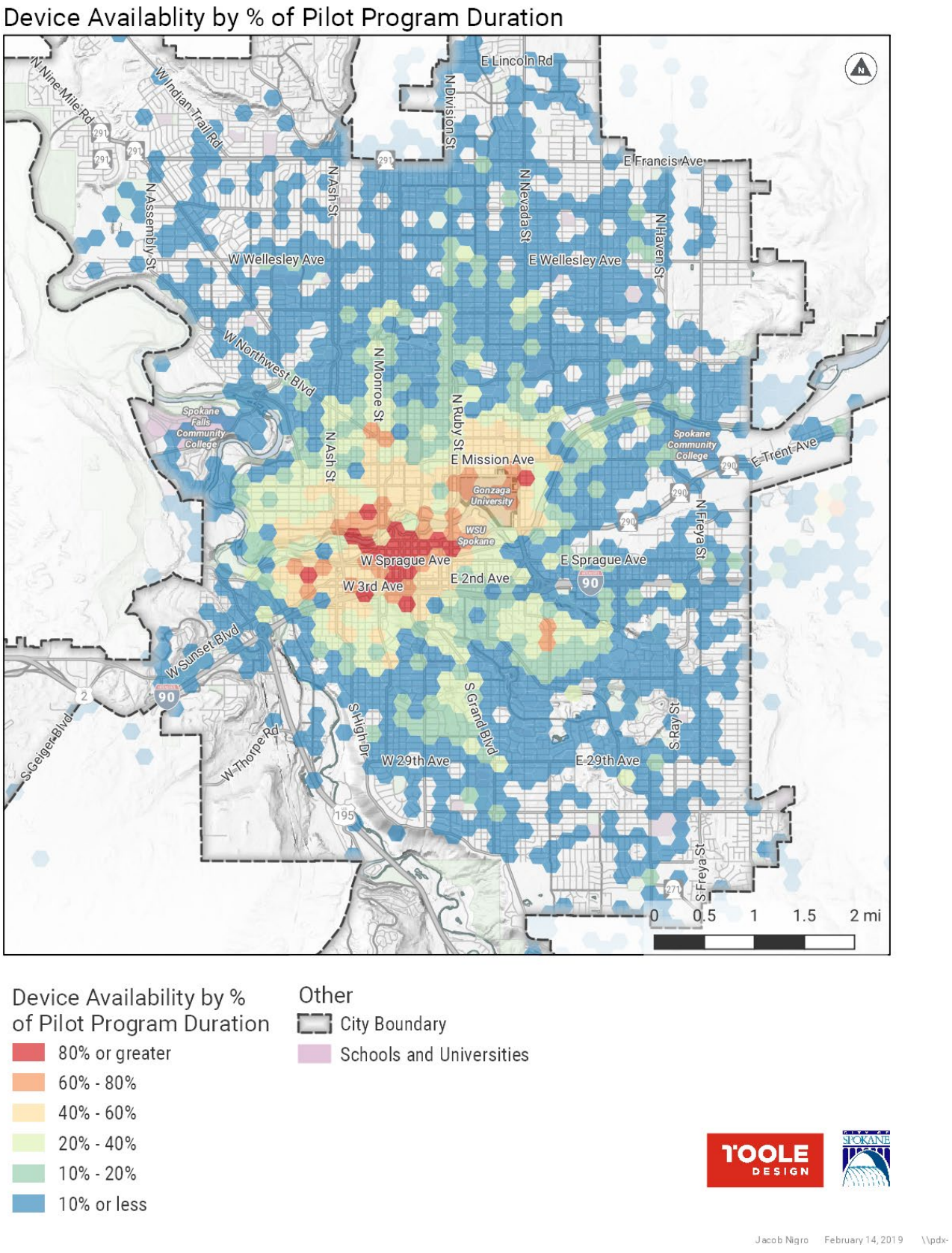

Figure 26: Percentage of time that a vehicle was available during the pilot program (by area).

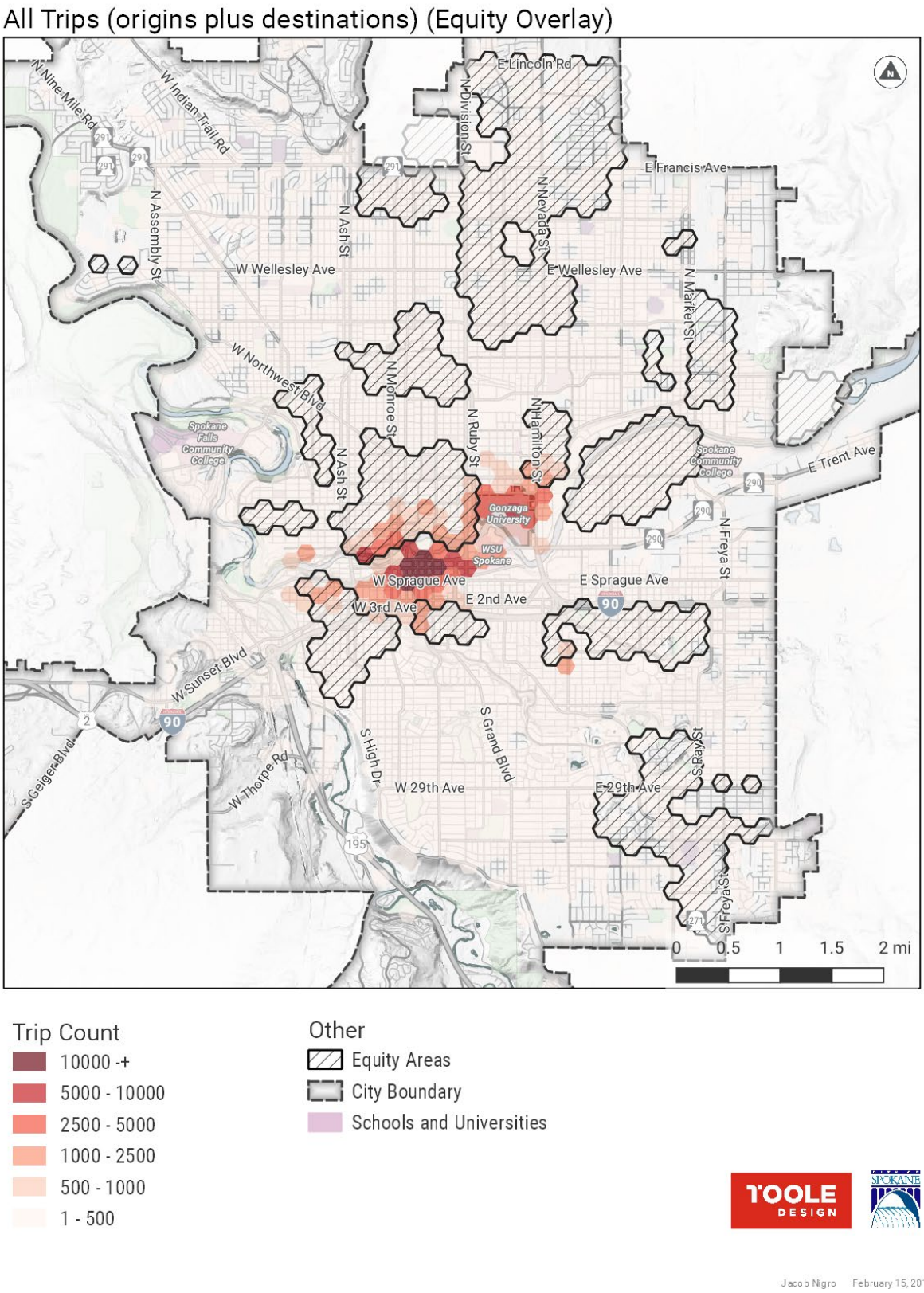

Figure 27: Heat map of shared mobility trip activity (i.e., the number of trips starting and/or ending in each area) overlaid with identified equity areas.

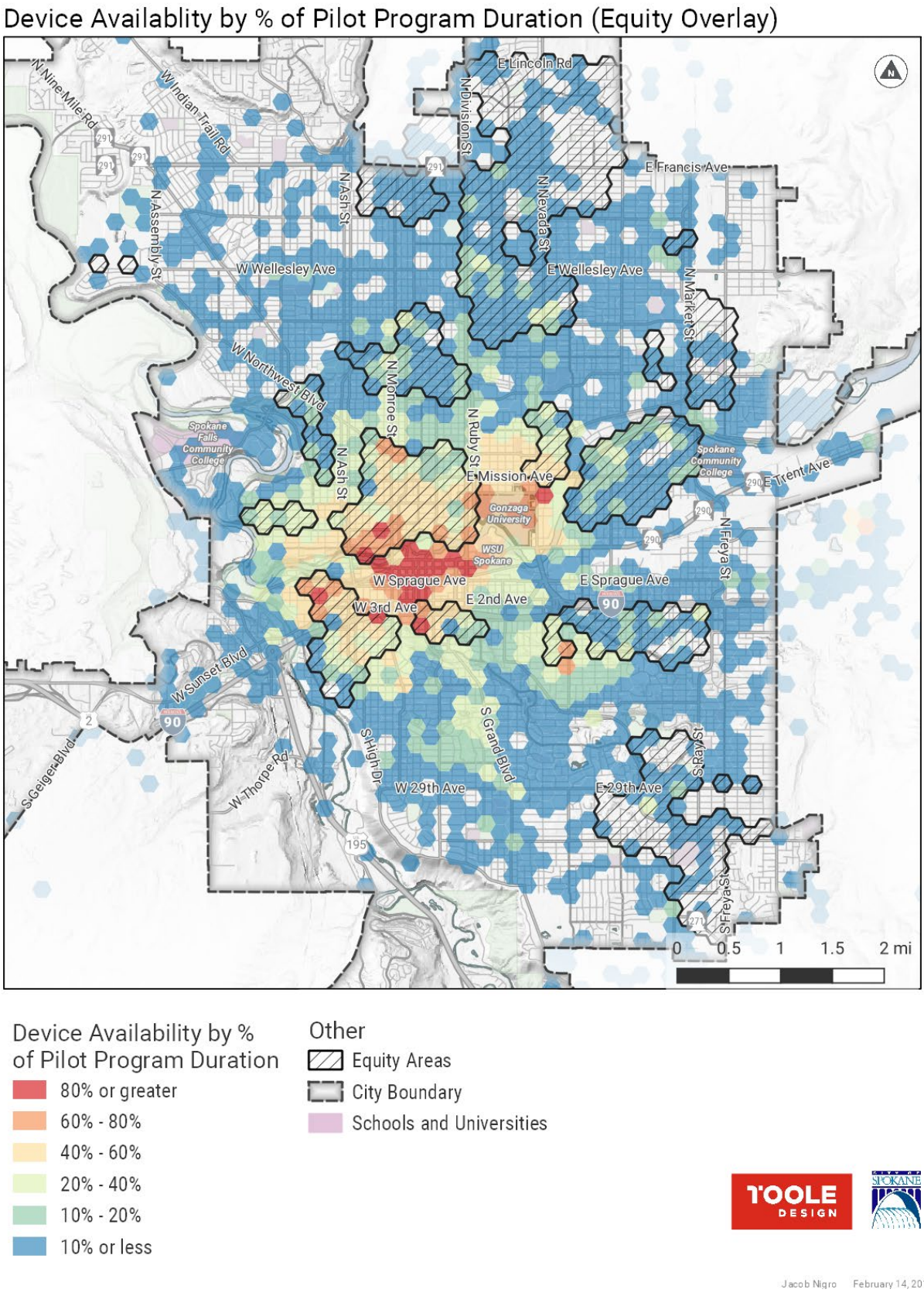

Figure 28: Percentage of time that a vehicle was available during the pilot program (by area) overlaid with identified equity areas.

CHAPTER 5
RECOMMENDATIONS FOR A PERMANENT PROGRAM

5. RECOMMENDATIONS FOR A PERMANENT PROGRAM

Shared mobility programs have been operating in cities ranging in size from small to large over the past couple of years. Initially, dockless bikeshare and e-scooter vendors simply placed bikes in city rights-of-way with little or no outreach or formal approval. However, cities such as Spokane, have created processes to engage and regulate dockless bikeshare and e-scooter operators using the public right-of-way.

The City of Spokane's shared mobility pilot program provided an opportunity to see how this type of program would operate before deciding on a permanent program. If the program is to become permanent, it will be important to formalize policies and requirements into a regulatory framework that outlines where and how vendors are to operate.

This chapter considers the results of the pilot program analysis (see previous chapters) along with best practices from other cities to develop recommendations for procurement, permitting, system size and coverage, parking requirements, data collection, performance evaluation, and other characteristics of a permanent shared mobility program.

REGULATORY POLICIES

The following sections are typical considerations for a shared mobility regulatory framework. They are important considerations shaped by the experience of the pilot program and case studies of best practice from around the United States.

PROCUREMENT AND PERMITTING PROCESSES

One of the most important considerations is determining the type of procurement, contracting, or permitting process that should be used to allow the program to operate. Communities have used several different models including requests for proposal (RFP) or requests for interest (RFI), sole source direct contracting, memoranda of understanding (for one or multiple vendors), or a right-of-way or other permit. Each of these range in their level of oversight, time to implement, and flexibility.

A sole source direct contract is one where the City or agency enters directly into a contract with a specific vendor to work with them to provide shared mobility services. The benefit of a sole source contract is that it is a quick, streamlined process. Some challenges may be if an agency has competitive procurement rules around the use of the public right-of-way or if an agency is restricted by the choices offered by a particular vendor.

A Request for Proposal (RFP) or a Request for Interest (RFI) can be used to help determine which vendor is the best fit and offers the right features and services for the location. It may result in a longer process, but it gives the city greater control to find and select the vendor or vendors that best fit their needs and opens up the process to multiple vendors allowing for competition.

A Memorandum of Understanding (MOU) is similar to a contract, except it has less legally enforceable elements. This has been used in quite a few U.S. cities to allow one or multiple vendors to provide service on an expedited timeline. The MOU outlines the expectations for service agreed between the municipality and bikeshare vendor and removes the need for a permit process.

A right-of-way or other permit is the most common form of regulation for dockless shared mobility programs. In this model, a formal process is established for vendors to apply to operate in the public right-of-way. A permit allows the municipality to outline their regulations and requirements for how the program should operate. For example, many cities specify the minimum and maximum number of vehicles or where they can be parked. It is a

way to open up the program to the free market and permits can be established for any number of vendors or on a first-come-first-served basis until the maximum number of vehicles is filled. Typically, there are fees associated with these permits that go towards paying for City oversight of the program. There is a longer time to have a new permit process be drafted, reviewed, and approved by executive staff and City Council.

- ### Results from Pilot Program Evaluation
  For the pilot program, Lime operated through a sole-source direct contract. This contract was derived from communications between the City and Lime. The sole-source direct contract was the best option for the pilot program because it was quick to implement.

- ### Best Practices
  The benefits and challenges of the different models are outlined above. An RFI or RFP process offers a competitive opportunity for vendors to respond to the City's list of desired program features and to showcase the features of their products.

- ### Final Recommendation
  An RFI or RFP process would allow Spokane to provide a competitive opportunity to different vendors to provide equipment and services that fit the specific needs of the program. The current vendor should be encouraged to bid having already provided service during the pilot program.

NUMBER OF VENDORS

Cities have generally chosen to go with a single vendor, to identify a maximum number of vendors, or to allow multiple vendors to provide shared mobility services. The benefits of multiple vendors are that it enables the market to dictate demand, allows the system to increase in size quickly, and encourages competition. The benefits of limiting or selecting a single vendor is a generally closer working relationship with one or a few points-of-contact that can respond quickly to requests. For users, having only one smart phone application and one system to figure out can be easier than having to manage multiple accounts.

- ### Results from Pilot Program Evaluation
  Overall, the results of the pilot program analysis showed that operational standards were maintained at a fairly high standard with a consistently available fleet of bikes, e-bikes, and e-scooters that were generally kept in good working order, regularly recharged, and rebalanced. The online survey showed high levels of support and good experience with the program. As importantly, having a single point of contact reduced the staff time required to manage the program and City staff felt that Lime was generally responsive to their requests.

- ### Best Practices
  Different approaches have been used by cities including selecting or contracting with a single vendor (e.g., South Bend, IN), using a selection process such as an RFI to select approved vendors, using a permit that caps the number of vendors (e.g., Denver, CO) or provides maximum fleet numbers (e.g., Portland, OR), or opening up the market to multiple vendors (e.g., Dallas, TX and Seattle, WA). Multiple vendors are often required in larger cities to provide the volume of bikes required to serve these locations.

- ### Final Recommendation
  Spokane is a mid-sized city that is still growing its bicycling infrastructure outside the downtown core. Given the likely size of the system and staff and the public's experience with a single vendor during the pilot program, it is recommended that the City continue to work and build a relationship with a single vendor. A second or more vendors could be considered if demand exceeds the

capacity of a single vendor or if new competition is warranted to encourage new technology innovations or enhanced service levels.

SYSTEM SIZE

Some cities have let vendors and demand determine the number of vehicles in the system; whereas some provide minimum and/or maximum fleet sizes to better manage availability and ease the public into the program. Many cities also have provisions for growth of the program.

- ### Results from Pilot Program Evaluation

  During the pilot program there were an average of 550 shared vehicles available. This ranged from a minimum of 68 and a maximum of 741. Over 90% of respondents of the online survey who used the pilot program stated that there were not enough vehicles. Further, the trips per vehicle per day among the vehicle types were 3.9 trips per vehicle per day for e-scooters and 2.9 and 2.4 trips per vehicle per day for e-assist bikes and pedal bikes respectively, indicating that there could be some unmet demand if the City of Spokane required a higher percentage of the fleet to be bikes or encouraged vendors to add more bikes. During the pilot program the percentage of e-assist bikes and pedal bikes were extremely low compared to scooters (approximately 71% less).

- ### Best Practices

  Austin, TX and Boulder, CO have provisions in their regulations to allow sustainable growth of their systems. In Austin, the initial permit allows a maximum of 500 vehicles per vendor, with expansion in 250 vehicle increments if they are able to meet a utilization rate of 2.0 trips per vehicle per day over a specified time period. Boulder limits each vendor to 100 bikes but allows them to increase the number of bikes in their fleet by 50 if these are accessible or e-assist bikes.

- ### Final Recommendation

  Spokane should set a minimum system size of 300 vehicles including a minimum of 50 regular bikes and 50 e-assist bikes; and a maximum initial system size of 700 vehicles including a minimum of 100 regular bikes and 100 e-assist bikes.

  System expansion should be allowed in increments of 300 vehicles (including a minimum of 50 regular bikes and 50 e-assist bikes) when it is shown that the existing program maintains a utilization of 2.0 trips per vehicle per day over a period of the two most recent months.

COVERAGE AREA

Cities have taken different approaches to regulating minimum and maximum coverage areas for dockless bikeshare. Some cities have defined boundaries that restrict the system to specific areas and some allow service to be provided to the entire city.

- ### Results from Pilot Program Evaluation

  During the pilot program, vehicles were allowed in all parts of the city, however the operator was encouraged to concentrate on the Downtown core, Gonzaga University, and inner-city neighborhoods. Usage was observed outside of these areas, and users that responded to the online survey did include many from zipcodes outside of the primary service area. In addition, many of the survey respondents stated that one of the barriers to using the program or using it more was bike availability in areas convenient to them.

- ### Best Practices

  Some cities restrict where the program can operate, some allow the program to operate anywhere within their city boundaries, and some cities like Bellevue, WA, which launched dockless bikeshare

in 2018, allow the program to operate anywhere in the city boundaries, but have identified areas where the operator must redistribute bikes. Their permit language states that “by 5:00 AM every morning, 75% of the fleet should be located within Activity Centers, 10% should be located within Frequent Bus Stops, and the remaining 15% should be located within Neighborhoods.”

The City of Portland requires that e-scooter permit holders redistribute vehicles to provide at least 100 scooters, each day, in identified equity communities. This is approximately 15% of each permit holder’s fleet (capped at 683 vehicles, per permit holder).

- ### Final Recommendation

  The program should be allowed to operate anywhere within the City boundaries. The fleet should continue to be redistributed to central areas including Downtown, Kendall Yards, and Gonzaga University. While these areas have some of the highest demand in the community, there are areas that do not have access to the program. It is recommended that the City require daily redistribution of at least 20% of the fleet in areas that provide access for low income and communities of color. This is in line with best practice in a number of other cities.

MANAGEMENT OF PARKING BEHAVIOR

Shared mobility regulations typically include requirements for where and how the vehicles can be parked. Many cities do not have any provisions for how bikes should lock or where in the city they can be parked. However, some cities have “lock-to” requirements that require technology providers to have an external lock that allows the vehicle to be locked to something, e.g., to a bike rack or other sidewalk furniture. Some systems also have designated “hubs” where vehicles need to be parked – these can be branded bike racks or geofenced block faces.

Regulations also typically specify where bikes can be parked, e.g., in the pedestrian buffer or the frontage zone and out of the pedestrian zone. There are also requirements not to block certain features such as sidewalks and pedestrian walkways, access points, doorways, utilities, bus stops, and other features. The requirements typically specify how long the operator has to remove a non-compliant vehicle. Some cities have used geofencing or painted parking areas to encourage parking in more organized locations as well as requiring vendors to distribute educational materials through their apps, websites, and other media.

- ### Results from Pilot Program Evaluation

  The field evaluation found that most vehicles were parked in the correct location and not causing any obstruction. However, there were 5% of e-scooters that were found lying on their sides and 11% that were obstructing a ramp or sidewalk. The online survey showed that 40% of respondents who had not used the program stated that they thought parking behavior was “poor” or “very poor”.

- ### Best Practices

  There are several ways to manage parking behavior. The City of Davis, CA, which is part of the Sacramento Area bikeshare program, is using geofencing to identify specific parking areas around city-provided corrals and racks. This can be done with or without bike racks in place. Geofencing could identify block-faces or bike racks for bikeshare parking. Some other cities with dockless bikeshare and e-scooter programs have painted parking areas to encourage parking in certain areas.

  Most shared mobility policies include where vehicles can and cannot be parked. This typically includes parking required on the sidewalk, in an upright position, maintaining adequate sidewalk clearances, and ensuring vehicles do not obstruct key features. Further, these regulations often also set time limits in which companies must relocate non-compliant vehicles (typically within 2 hours).

- ### Final Recommendation

  During the field evaluation of the pilot program, parking behavior was good, however, it was identified as one of the issues non-users experienced during the pilot program. The City of Spokane should take a proactive approach on regulating and encouraging good parking behavior to ensure that parking doesn't remain an issue or worsen as the program expands. To improve behavior the following are recommended:

  - The policy should state preferred parking areas and where on the sidewalk vehicles can be parked – which includes the pedestrian buffer and frontage zone. Preferred areas could include plazas, trail heads, curb extensions, sidewalks with wide pedestrian buffers or frontage zones, etc. It should restrict parking in front of entrances, pedestrian or vehicle accesses, ADA access, bus stops, and ramps.
  - The policy should outline response time for removing improperly parked or toppled over vehicles. Response time should be less than one hour for vehicles blocking entrances, pedestrian or vehicle access, ADA access, bus stops, and ramps. Response time should be two hours for improperly parked or toppled over vehicles, but that are not causing access issues.
  - The City of Spokane and the vendor(s) should identify areas for vehicle redistribution that meet the description of preferred parking areas.
  - For long-term assurance that parking will not become a problem, the City of Spokane should work with the vendor(s) on geofencing areas where vehicles cannot be parked (parks, historic sites, private property, etc.) and where vehicles should be parked (areas that have been identified as preferred parking areas).
  - The City of Spokane and the vendor(s) should develop an ad campaign to promote better parking behavior or an encouragement program to incentivize users to park in geofenced parking areas.

PERFORMANCE EVALUATION AND DATA REQUIREMENTS

Data requirements should be established at the start of the program. Experience to date has shown some data transparency issues occur when data requirements are not explicitly defined. The industry is becoming more consistent in defining these data standards and provide an example for the City of Spokane.

- ### Results from Pilot Program Evaluation

  Data provided by Lime during the pilot program conformed with the Mobility Data Specification (MDS), a new national industry standard for collecting shared mobility data. Further, the City of Spokane had access to the raw data through an Application Programming Interface (API), which provided the City with access and the ability to analyze the program's data.

- ### Best Practices

  Many policies request that real-time data be shared in either MDS or API format and that monthly reports be provided to detail usage, number of vehicles in service, reported crashes, repair information, illegal parking instances, redistribution times and locations, customer complaints, theft and vandalism, etc. Further, many policies have also required that companies distribute user surveys developed by the cities, similar to how the Spokane Bikeshare Survey was distributed by Lime.

- ### Final Recommendation

  The City of Spokane should require the vendor to conform with the MDS standard and provide the raw data through an API. Further, the City of Spokane should require monthly reports outlining usage, number of vehicles in service, reported crashes, repair information, illegal parking instances, redistribution times and locations, customer complaints, and theft and vandalism. The City of Spokane should also develop an agreement with the provider that they'll promote any city efforts to survey users.

MUNICIPAL STAFFING NEEDS

Even though shared mobility programs are provided by the private sector, municipal staff time is often required to oversee the program. The degree of involvement varies depending on the amount of oversight desired but at a minimum could include developing an RFP or establishing the permit system or MOU requirements, developing marketing and education materials for web or print, determining the fleet size and service area, fielding complaints or questions about the bikeshare program, monitoring and evaluating parking performance, maintenance, and redistribution of the bikeshare fleet, analyzing ridership and performance data, and continuing to plan for future initiatives or expansions of the bikeshare program.

- ### Results from Pilot Program Evaluation

  It is unknown exactly how much staff time went towards the development and oversight of the pilot program. However, at least one staff person was partly committed to overseeing the pilot program.

- ### Best Practices

  After several interviews with staff at agencies where they've implemented a similar pilot program, our estimates show that before launch approximately 35 hours per week were spent by a staff person to help establish the program and once launched it is reduced approximately 10 hours per week.

- ### Final Recommendation

  Identify a staff person to provide oversight for the program. This staff person will be the point person for the permanent program's vendor(s). In addition to regular oversight – analyzing ridership data, ensuring that vehicles are distributed as required, resolving any maintenance requests, and monitoring the fleet size – this person would also have the responsibility of leading any future program development, policy updates, equity or encouragement programming. It is recommended that the new Bike and Pedestrian Planner budgeted for 2019 should be the person supporting the oversight of this program.

FEES

To offset municipal costs associated with dockless bikeshare – including staff time, enforcement of parking regulations, and improving parking or bike infrastructure – most municipalities require vendors to pay permit fees.

- ### Results from Pilot Program Evaluation

  The City did not charge any fees to Lime during the pilot program. 135,872 trips were made during the pilot program and a total of 1,624 unique vehicles (1,305 scooters, 194 e-assist bikes, and 125 pedal bikes) were used in Spokane during the 74-day pilot.

- ### Best Practices

  Permit fees vary among cities, but they can include a one-time permit fee plus some form of annual fee per vehicle or a per trip rate. Table 5 summarizes some of these fee programs using case studies in Denver, CO, Minneapolis, MN, and Portland, OR.

Table 5: Summary of Program Fee Examples

City	Fee	Fee Element
Denver, CO	$150 $15,000 $30	Application fee Permit fee Per vehicle performance bond
Minneapolis, MN	$20 $1	Per scooter Per vehicle per day
Portland, OR	$250 $5,000 $0.25	Permit fee Pilot permit fee Per trip surcharge

- ## Final Recommendation

  Applying these models to a mock year-long program, based on the pilot program data, earns different returns for the program. The pilot program resulted in the following: 1,624 unique vehicles, an average of 550 vehicles available each day, an average of 3 trips per vehicle per day, a total of 135,872 trips were made, and the program ran for 74 days. Note that we made assumptions based on the pilot program. In the future the program could be larger or smaller and the number of unique vehicles may be different. During the pilot program four generations of Lime e-scooters were deployed. It is unknown if that's typical or if there was an element of testing happening in Spokane during the pilot program.

  Based on that data, a mock year-long (365 days) program could use approximately 8,000 unique vehicles and yield approximately 670,000 trips. Applying the models above would earn the following returns:

  - Denver: $15,150 guaranteed upfront revenue plus a $240,000 performance bond to offset any costs with enforcing parking behavior,
  - Minneapolis: $160,000 revenue based on the total number of scooters plus $200,750 based on the average number of vehicles available per day.
  - Portland: $5,250 upfront revenue plus $167,500 in per trip surcharge fees.

  The most effective model to generate revenue for the city would be to charge a $20 - $30 per scooter maintenance fee and $1 per vehicle per day. One off permit fees are generally low revenue earners for the agency. These fees should be used to cover staffing, encouragement programs, and investments in bicycling infrastructure.

EQUITY

Shared mobility has the potential to facilitate and improve access to transit, jobs, and other destinations, especially for historically underserved and disconnected communities. Better serving low-income and other underserved communities is a priority for any shared mobility program.

- ## Results from Pilot Program Evaluation

  Lime has two programs to target underserved communities. The first is Lime Access, where qualified individuals can get discounted fares. The second, Lime has partnered with PayNearMe,[11] a financial services app that allows users to pay bills and make online purchases with cash at one of 28,000 participating 7-Eleven stores. Both of these services were available during the pilot program, however neither were promoted extensively.

- ## Best Practices

  Many cities are requiring bikeshare vendors provide a cash payment option and some do additional equity programming. Washington, D.C. requires all dockless bikeshare permit holders to distribute and maintain bikes in all of the Wards of the District. Cities such as Portland, OR require that at least 20% of the dockless e-scooter fleet be available in underserved communities that are defined in their permit requirements.

  Ithaca, NY received a Better Bike Share grant to collaborate with community partners to hire and train five Ithaca Bike Champions who conducted outreach and education before, during, and after the launch of their dockless bike share program in April 2018.[12] In San Francisco, Jump Bikes offers a low-income discount to match Ford GoBike's (San Francisco's docked bikeshare system) Bikeshare for All[13] subsidized membership program. The reduced membership fee program allows qualifying low-income

[11] PayNearMe. 2018. https://home.paynearme.com/en/help/.
[12] Better Bike Share. 2017. http://betterbikeshare.org/grants/
[13] Ford GoBike. 2018. "Bike Share for All." https://www.fordgobike.com/pricing/bikeshareforall.

residents to sign up for a $5 annual membership their first year, then pay $5 per month ($60/year) in subsequent years.[14]

- ### Final Recommendation

  It is recommended that the City select a vendor that has low-cost and cash-payment access programs. Requirements for the vendor should also include a target percentage of the fleet to be provided in low-income and disadvantaged communities. As part of providing municipal oversight, the City staff person responsible for the program should also incorporate equity program that could include shared mobility options as part of their responsibilities.

TRANSIT INTEGRATION

A successful transit system offers a seamless transition between multiple modes. A permanent shared-mobility program could play an important role in the Spokane transit system and offer a relatively low-cost-to-implement solution to first and last mile travel. In the U.S., shared mobility systems are attempting to better integrate with other transit systems.

- ### Results from Pilot Program Evaluation

  Respondents to the online survey who had used the program included 20% that reported regularly using transit and some that used a shared mobility trip to replace a transit trip. There is an opportunity for shared mobility to be used to better access transit or to connect between transit modes.

- ### Best Practices

  Bikeshare and shared mobility programs have integrated with transit in a number of ways including redistributing vehicles to bus stops and transit centers, partly integrating transit cards by allowing someone to pay for transit and bikeshare using the same card (although they are kept as two separate payment accounts), and fully integrating fare payment into one account that can be used to pay for all transit modes.

  Example of a semi-integrated fare card includes LA Metro, which incorporated bikeshare into their transit fare card (TAP card) system. When a transit rider purchases a TAP card they can go online or call Metro Bike Share and/or Breeze Bike Share to register for a bikeshare membership and add that membership to the TAP card. The TAP card includes an RFID chip that can be programmed with multiple accounts and that can be recognized at the bikeshare station to check out a bike. However, the transit and bikeshare accounts are separate and funds stored on the TAP card for transit cannot be used for bikeshare charges. These are charged directly to the registered credit card.

  Transit and bikeshare payment systems that are fully integrated includes one account with a single card that can be used to pay for all transit modes. This would be the equivalent of adding bikeshare to the ORCA card in Seattle or the Clipper Card in the San Francisco Bay Area. In the U.S., there are no transit agencies that have fully integrated their fare payment systems to include bike share. These systems do exist in other parts of the world such as the “Intelligent Card (IC)” system in Japan. However, in the U.S., there are technical and institutional barriers to overcome including different card reader technologies, security protocols, and the need to develop revenue sharing agreements and decision-making structures between multiple organizations.

[14] Jump Bikes. 2018. “Boost Plan.” https://jumpbikes.com/cities/san-francisco/boost-plan/.

The City of Pittsburgh was the first city in the US to pilot free bikeshare fare with a transit membership in January 2018. During the six-month pilot of the linked systems, initial results showed a 4.3% increase in bikeshare ridership, as opposed to previously flat growth.[15]

- ### Final Recommendation

  It is recommended that the vendor selected to operate in Spokane should work with STA to determine potential options for integrated or semi-integrated ticketing and fare payment. In the short-term, the selected vendor could create a program similar to the City of Pittsburgh and offer free bike and e-scooter share during a pilot period and should also be encouraged to redistribute vehicles to key transit stops.

TECHNOLOGY UPGRADES

Shared mobility technology is developing and adapting rapidly and the program and its regulations should be flexible enough to adapt to new technology offerings.

- ### Results from Pilot Program Evaluation

  Shared mobility technology changed even during the pilot program. In fact, Lime deployed four generations of e-scooters during the pilot.

- ### Best Practices

  Permit terms are included in contracts with vendors to provide cities the opportunity to change vendors or revoke the permit. Reasons to include permit terms are greater than ensuring innovation, however they provided opportunities for renegotiations or rebids to upgrade to the latest technology.

- ### Final Recommendation

  To keep up with technological advances, it is recommended that the City of Spokane takes three steps to ensure both short- and long-term innovations within the program.

  - Procure a vendor through an RFP process and review technology options at the start of the program. Request that vendors outline current technologies that they're deploying and upcoming innovations or changes within the next year.
  - Set contract terms such that contracts can be renegotiated or rebid to get the latest technology; and
  - Include language in the contract that gives power to staff or a decision-making group to consider and incorporate new technology as it is developed.

[15] http://betterbikeshare.org/2018/01/19/pittsburgh-milwaukee-explain-linked-bike-share-transit/