

SPC on T&T -December 16, 2020

Shared Micro-Mobility Data Analysis Project

University of Calgary

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Project Introduction



Background:

- Civil Engineering final year project
- Supervisor: Dr. Farnaz Sadeghpour



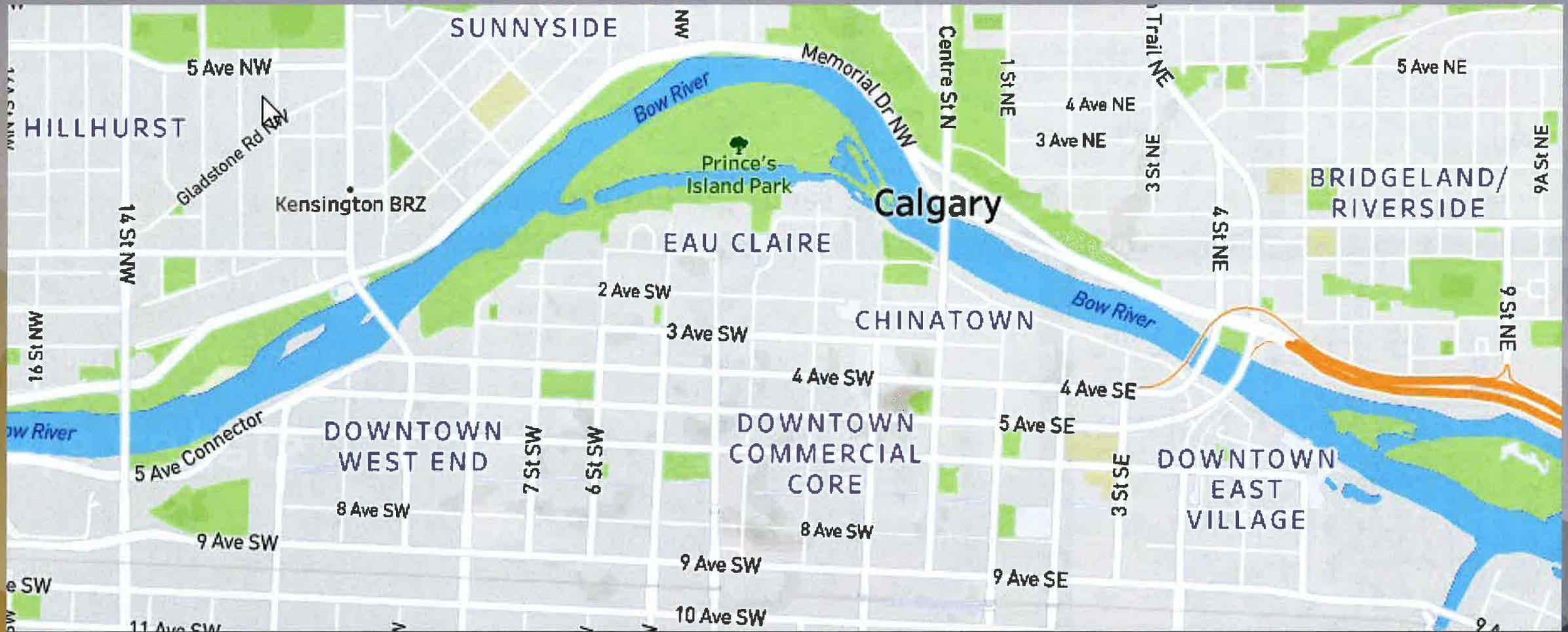
Objective:

- Demonstrate value of data in making informed decisions



Scope:

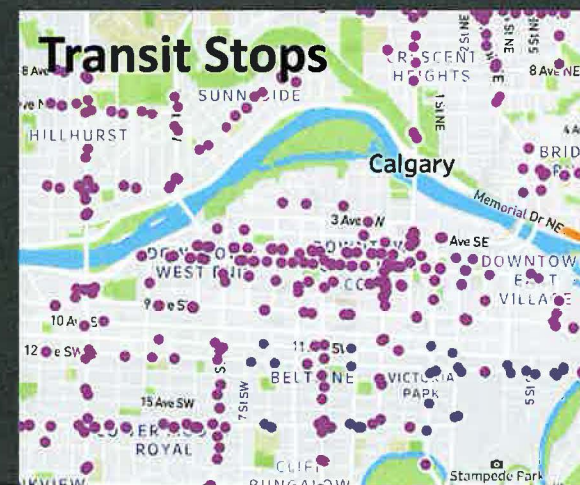
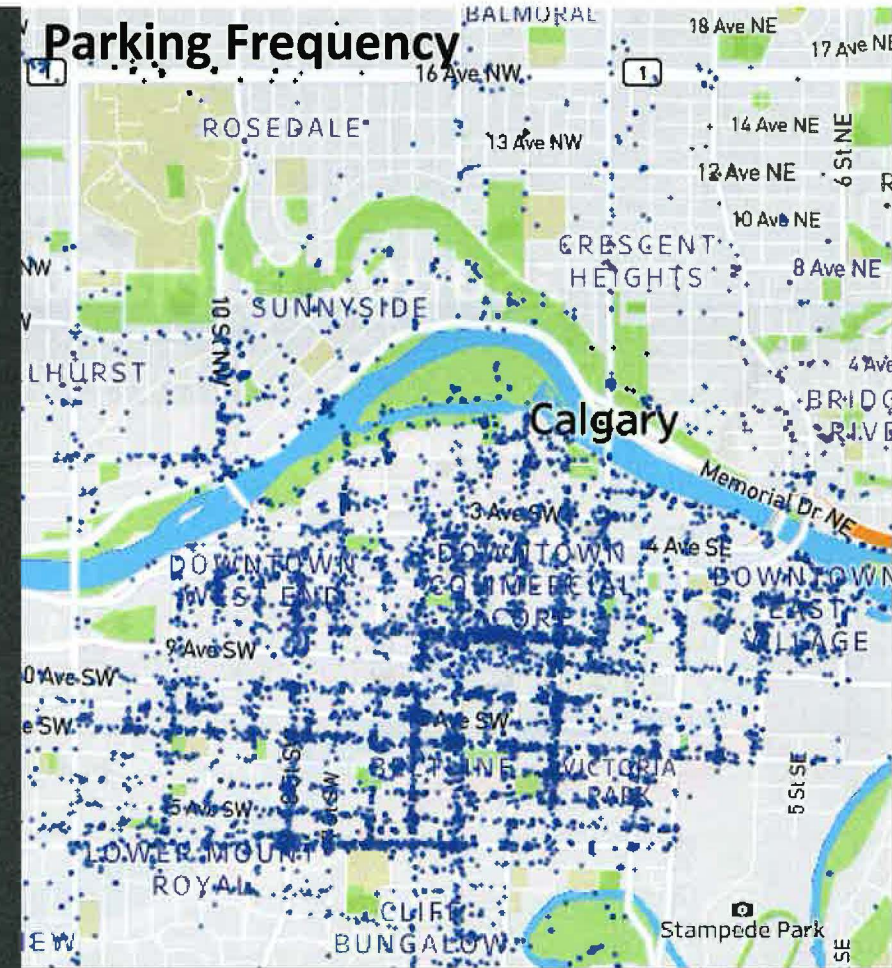
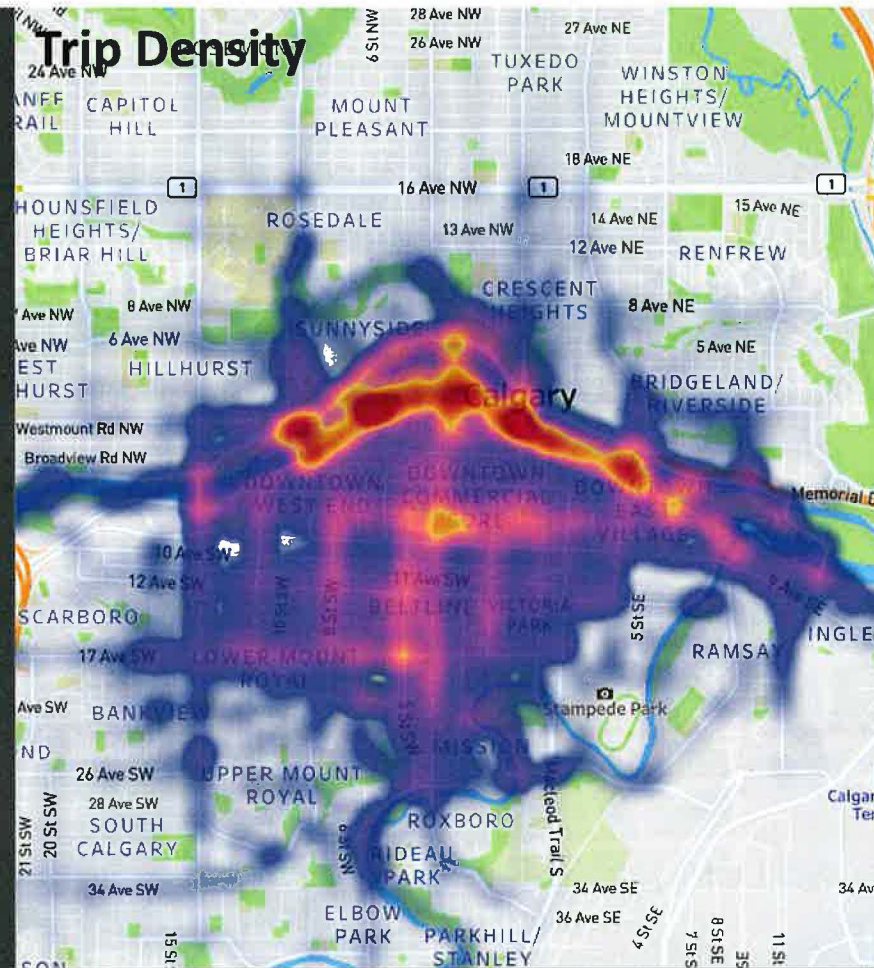
- Limited to data from City of Calgary



Where are the best locations for e-Scooter parking zones?

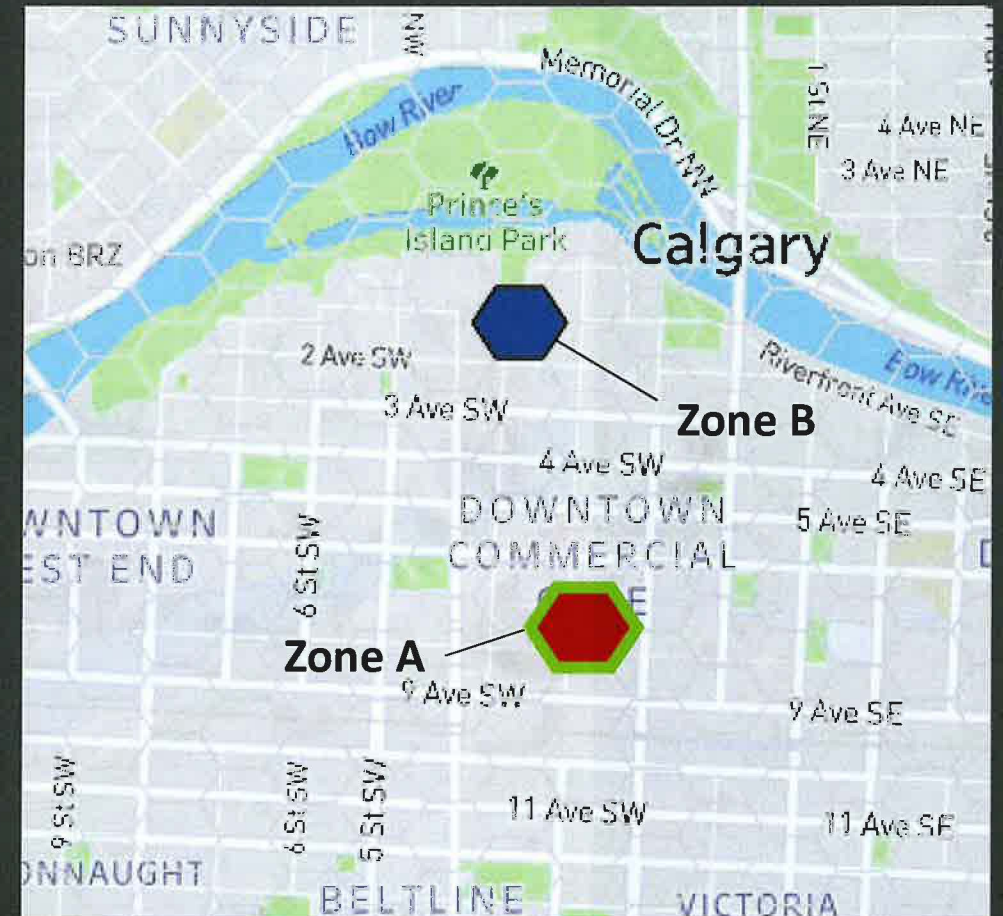
Data Layers

- Pilot Program Data
- City of Calgary open data

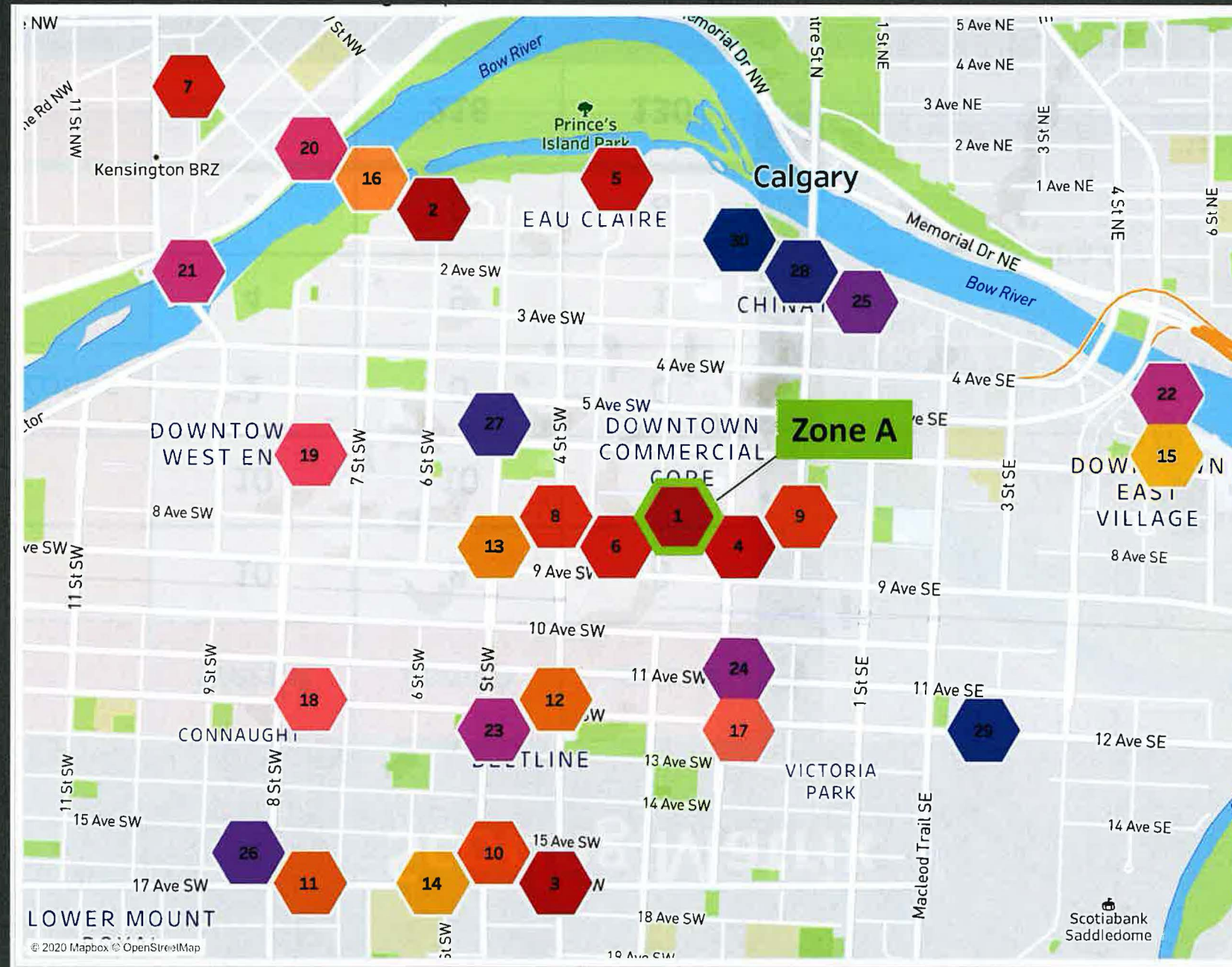


Scoring Matrix

Data Layer	Weight	Zone A	Zone B
Trip Density	10	8	8
Parking Frequency	10	10	3
Operator Dropoff Zones	2	0	0
Transit Stops	4	9	1
Street Parking	2	0	8
TOTAL SCORE		216	130



Top 30 Parking Zone Locations



Next Steps



Automate data
analysis



Produce further
insight

Team Deliverables



Interactive Data Model

- Capable
- User-Friendly



Data-Based Recommendations

- Engineering recommendations relating to safety and infrastructure



Data Output Report

- Key numerical and visual outputs from data analysis

Modes of Analysis



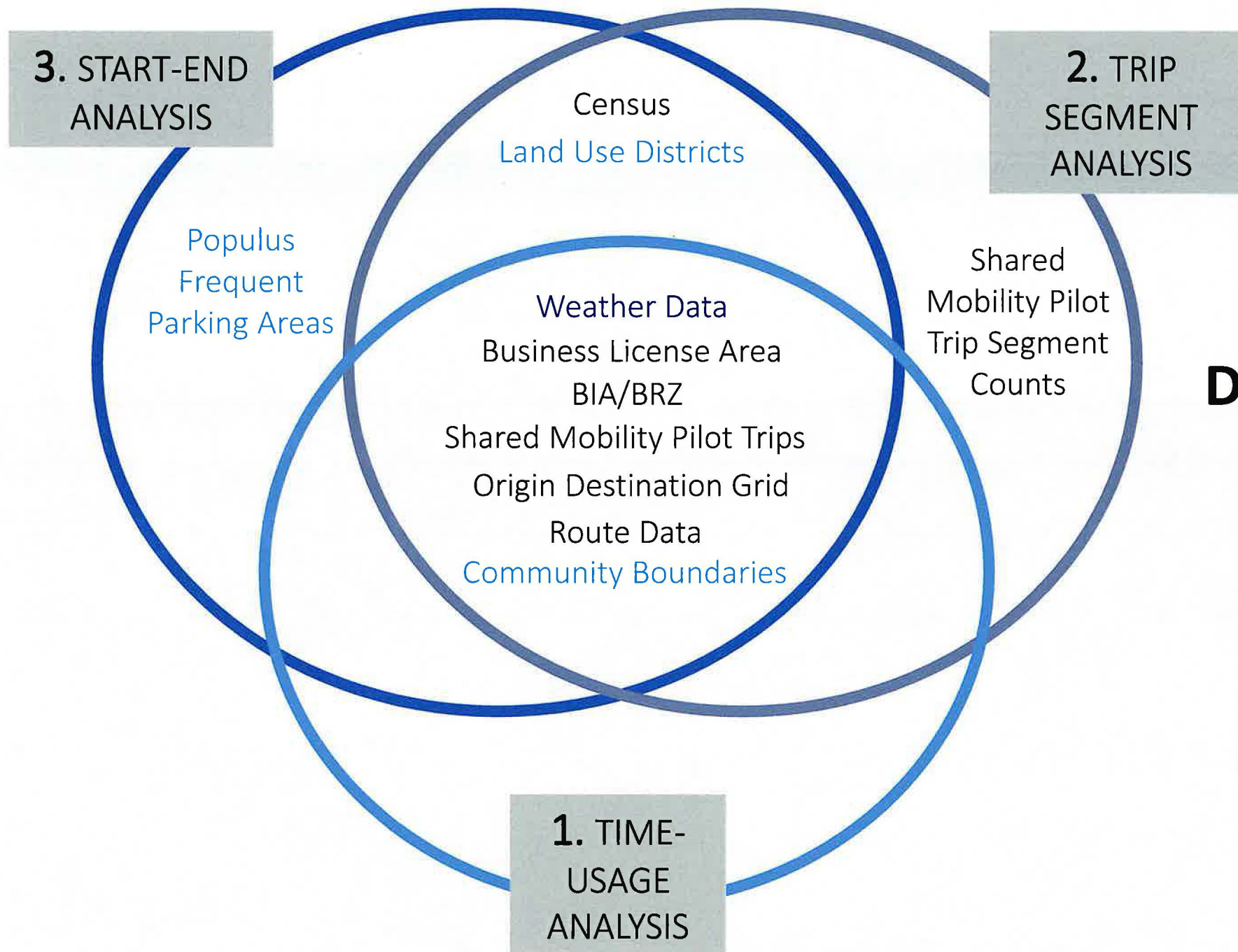
1. Time-Usage
Analysis



2. Trip Segment
Analysis



3. Start-End
Analysis



Data Sources

LEGEND

- Spatial Data
- Non-Spatial Data
- Both

1. Time-Usage Analysis (TUA)



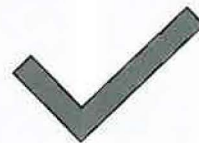
Analyzes usage by month, days of the week, and hours of the day



Effects of temperature and weather on e-scooter usage

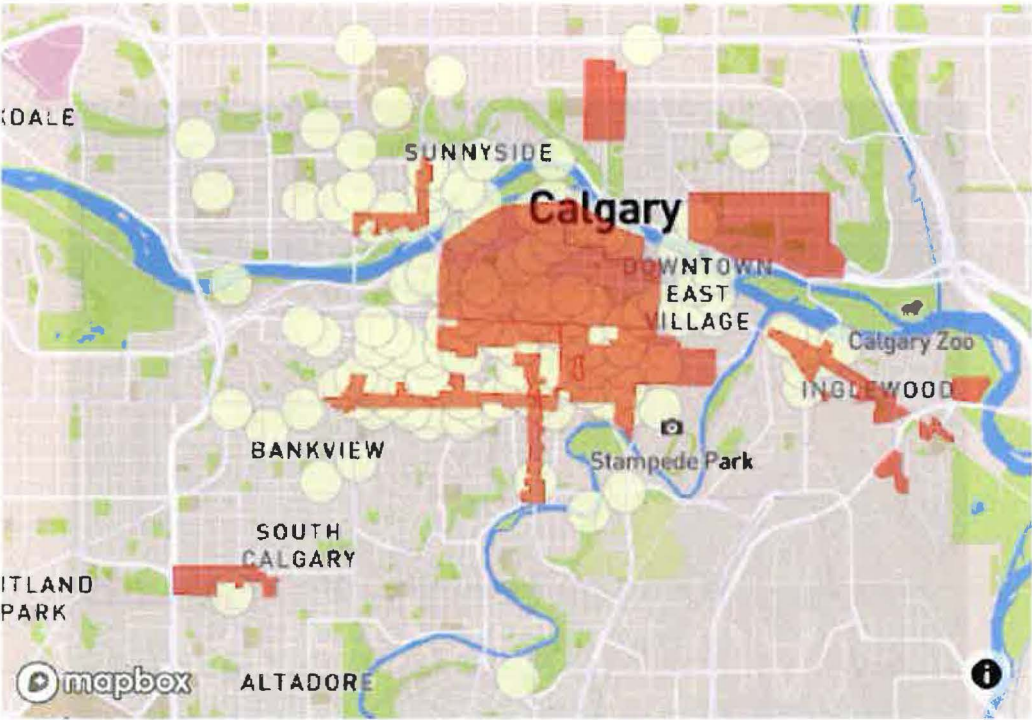


Features will be extended in Start-End Analysis

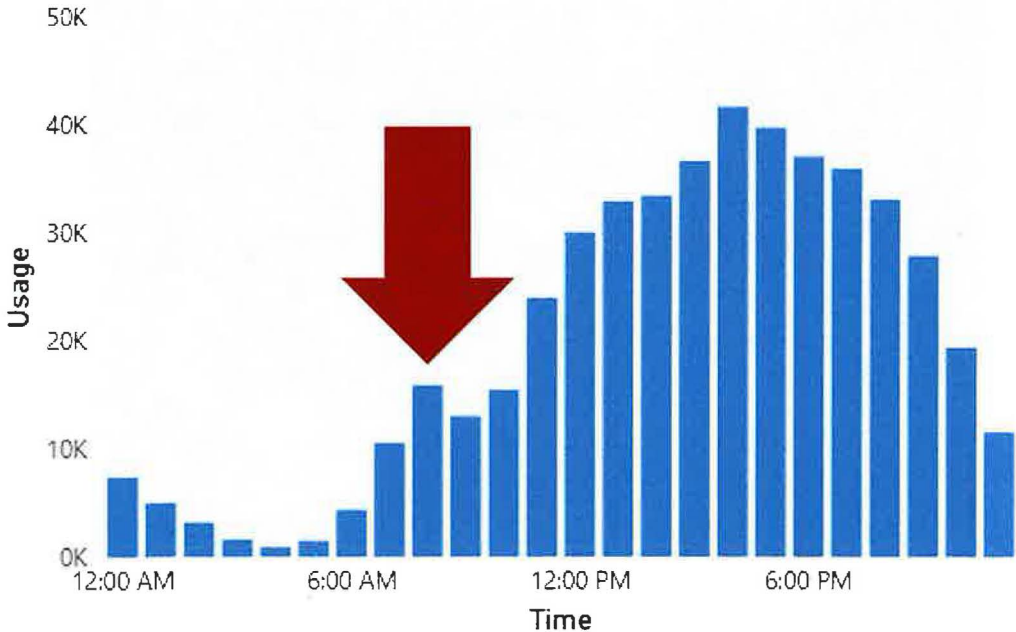


Make recommendations to improve ridership based on peak usage

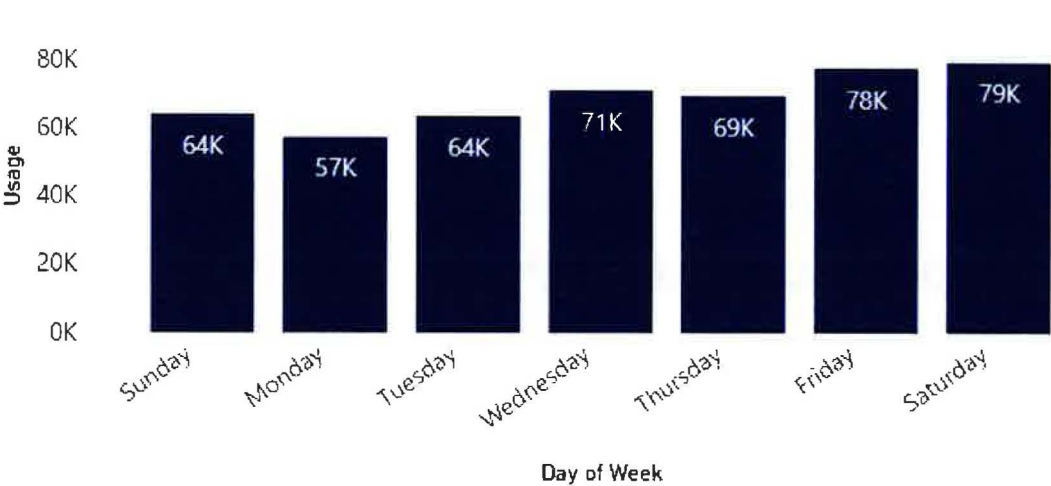
Trip Start and Endpoints 2019



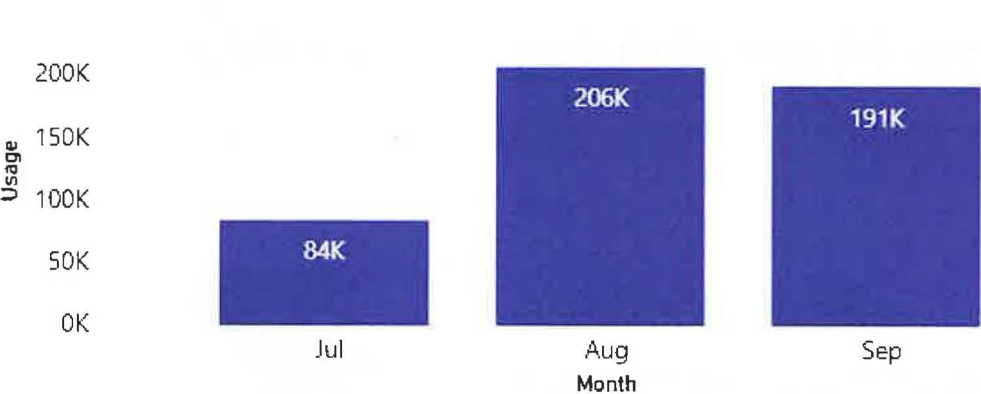
Usage Per Time of Day



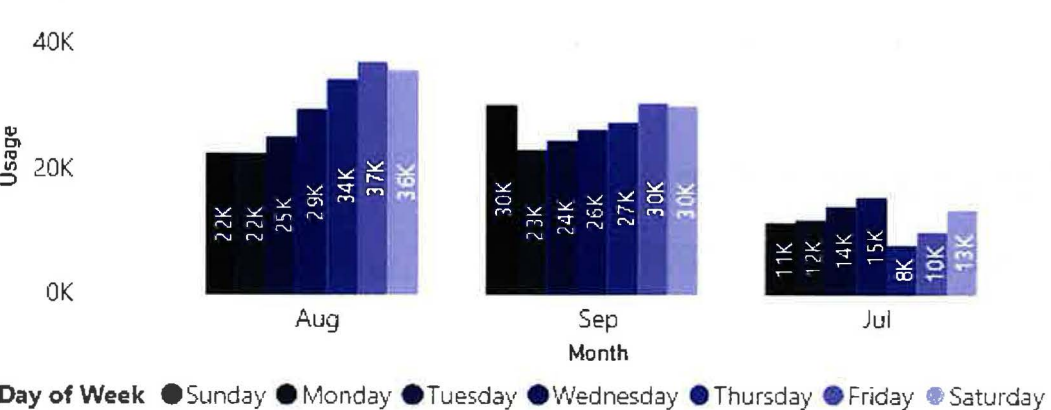
Usage Per Day of Week



Usage Per Month



Usage Per Month Sorted By Day of Week



Month

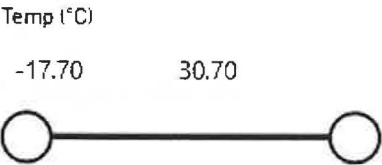
Jul Aug Sep

1.85K

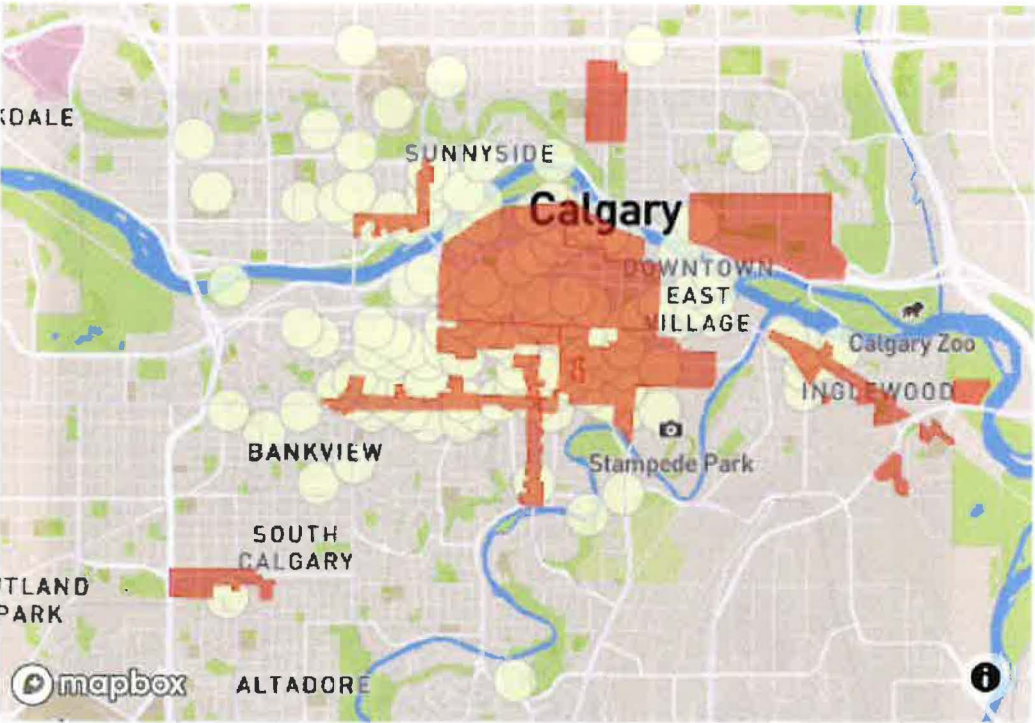
Average of Trip Distance in Meters

12.85

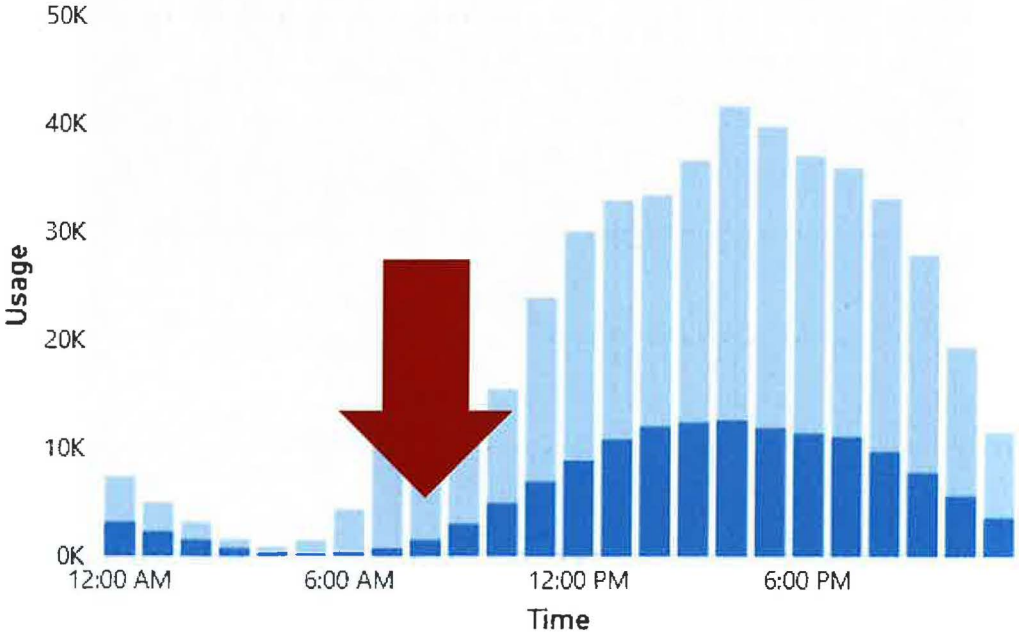
Average of Trip Duration in Minutes



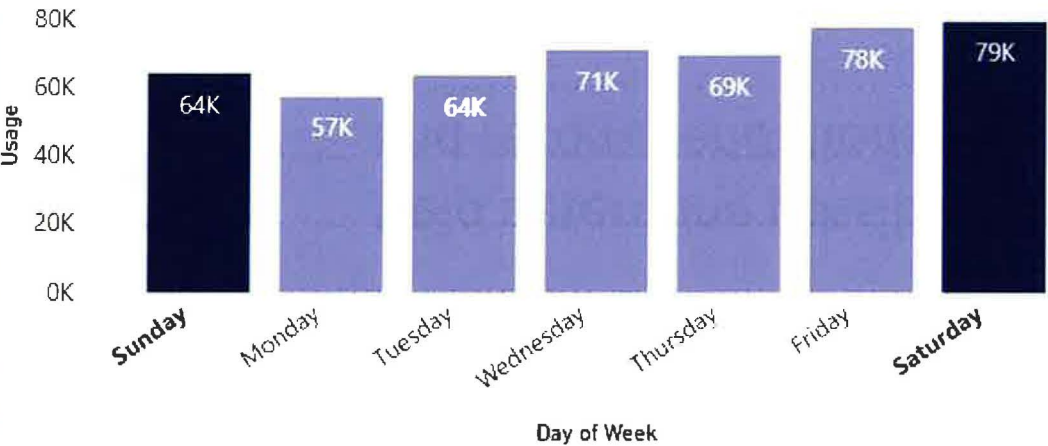
Trip Start and Endpoints 2019



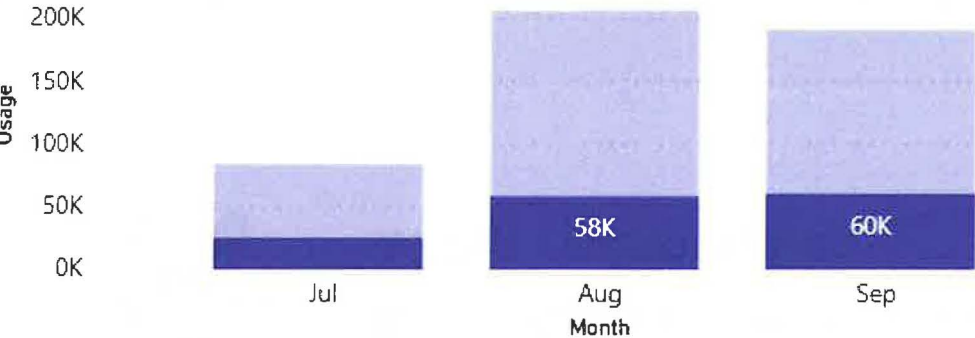
Usage Per Time of Day



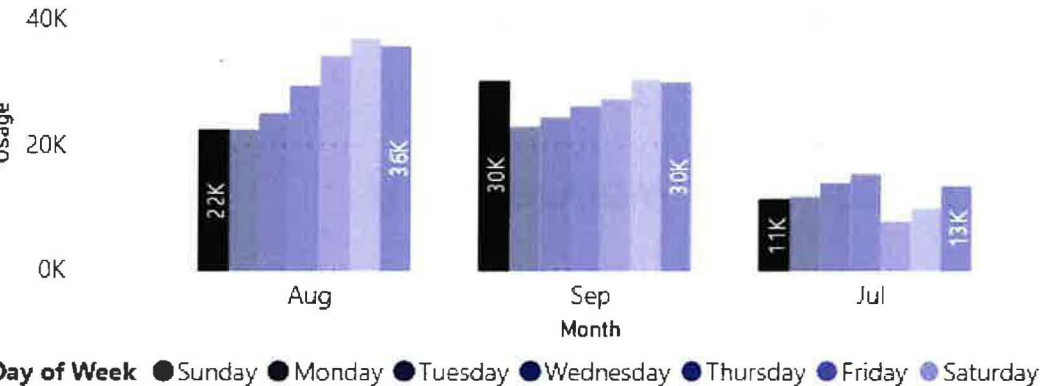
Usage Per Day of Week



Usage Per Month



Usage Per Month Sorted By Day of Week



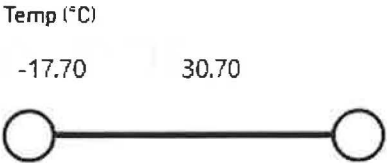
Month
Jul Aug Sep

2.11K

Average of Trip Distance in Meters

15.21

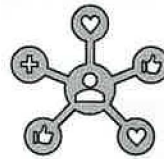
Average of Trip Duration in Minutes



2. Trip Segment Analysis (TSA)



An overview of routes chosen by riders



Route patterns and examining popularity within communities

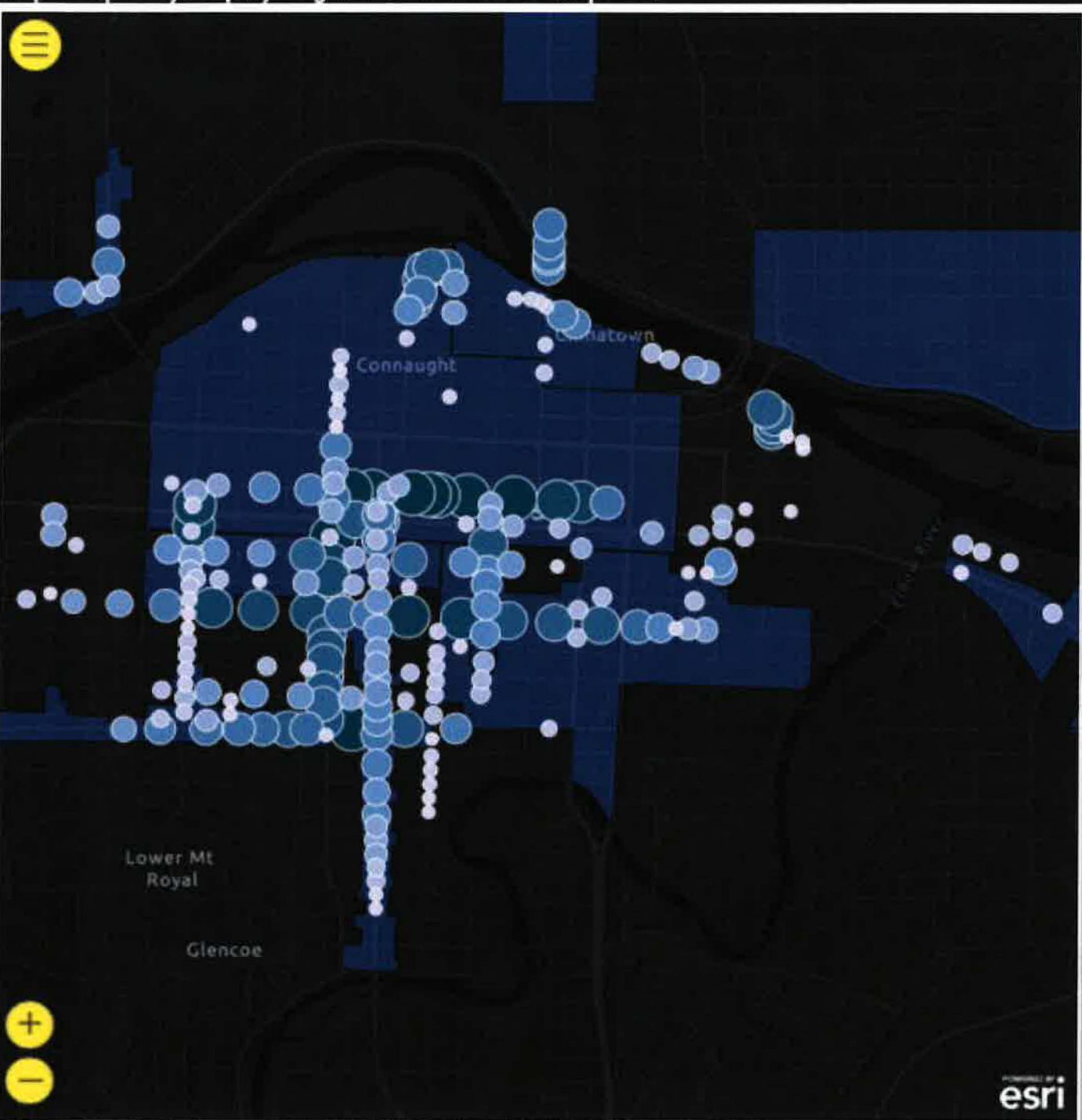


Relationship between the trips and the surrounding area



Help determine possible improvements and recommendations to popular routes

Trip Frequency Map by Segment Centre Point (Top 200)



Route Frequency

Street Name	Frequency
ZOO RD NE	545
YPRES WY SW	56
YPRES ME SW	33
YPRES LN SW	1
YPRES GR SW	135
WORCESTER DR SW	37
WOODVIEW TC SW	2
WOODVIEW DR SW	35
WOODVIEW CR SW	2
WOODVALE RD SW	7
WOODVALE CR SW	3
WOODSTOCK RD SW	1
WOODRIDGE TC SW	5
Total	3291890

Trip Frequency Range



Land Use Classification

- ☐ Commercial
- ☐ Commercial - Core
- ☐ Direct Control
- ☐ Future Urban Development
- ☐ Industrial
- ☐ Institutional
- ☐ Major Infrastructure
- ☐ Mixed Use
- ☐ Parks, Recreation and Public Education
- ☐ Recreational
- ☐ Residential - High Density
- ☐ Residential - Low Density
- ☐ Residential - Medium Density
- ☐ Transportation and Utility Corridor

Business Licenses

Business License Types	Number of Specified License
RETAIL DEALER - PREMISES	6729
FOOD SERVICE - PREMISES (SEATING)	2987
FOOD SERVICE - PREMISES	2192
WHOLESALE	2061
MANUFACTURER	1676
PERSONAL SERVICE	1562
CONTRACTOR	1358
ALCOHOL BEVERAGE SALES (RESTAURANT)	1283
FOOD SERVICE - PREMISES (NO SEATING)	1102
MOTOR VEHICLE REPAIR AND SERVICE (1)	1000
Total	15

3. Start-End Analysis (SEA)



Analysis of origins and destinations



Inter/Intra-community and BIA analysis

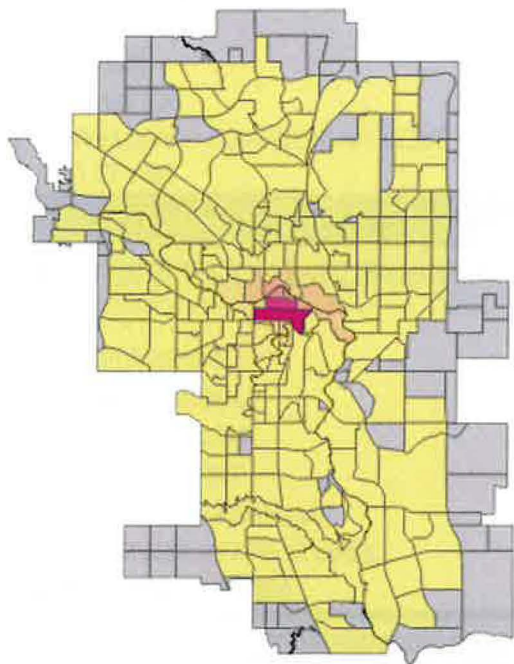


Understanding the WHERE and WHY behind trips

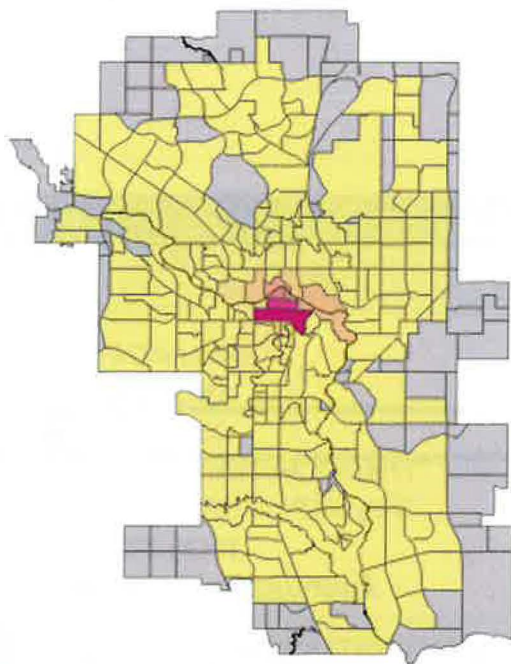


Generate e-scooter parking recommendations based on popular origins and destinations

Travel by Origin



Travel by Destination



Origin Community

- ☐ ABBEYDALE
- ☐ ACADIA
- ☐ ALBERT PARK/RADISSON HEIGHTS
- ☐ ALTADORE
- ☐ ALYTH/BONNYBROOK
- ☐ APPLEWOOD PARK

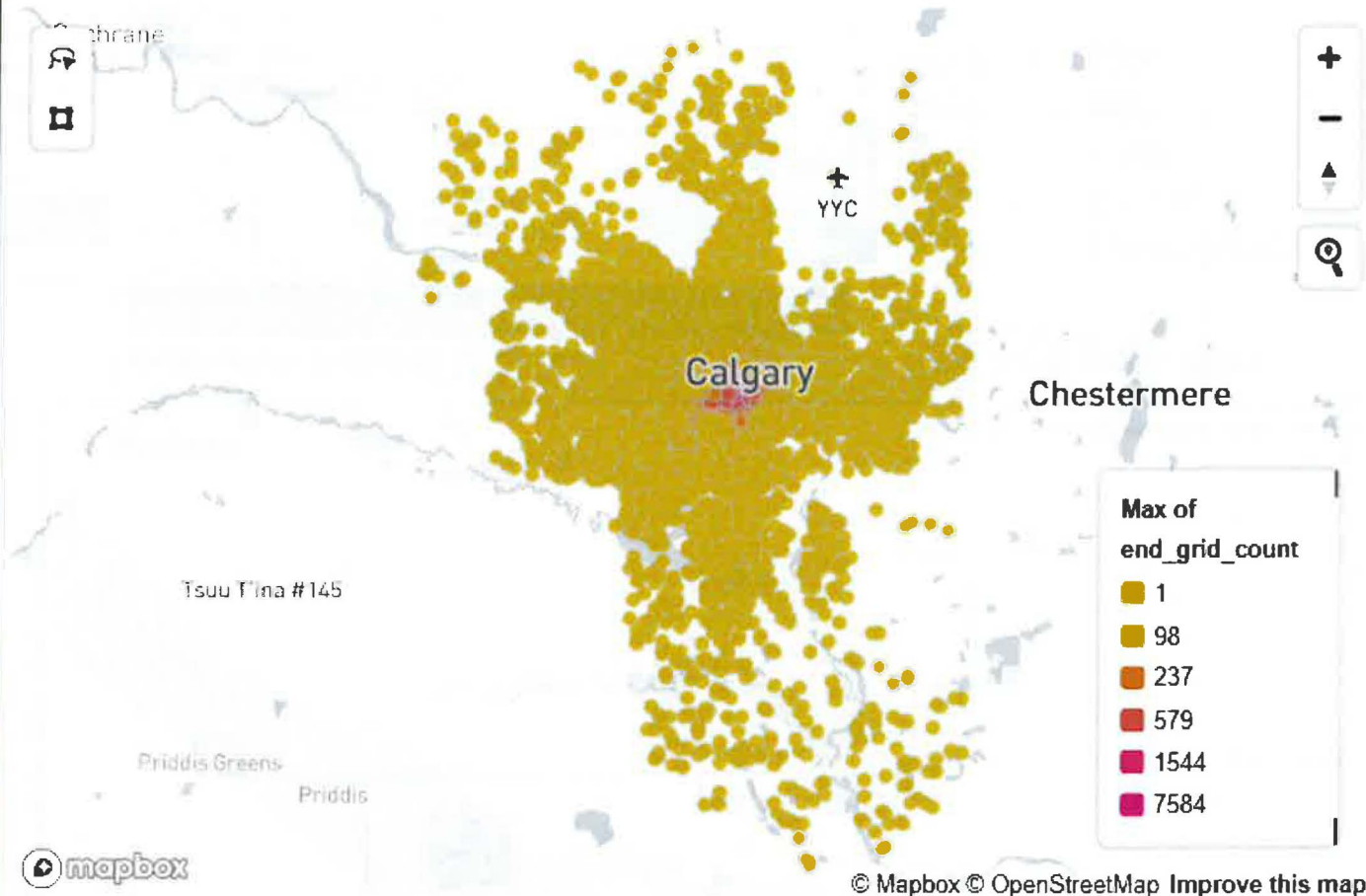
Destination Community

- ☐ EAGLE RIDGE
- ☐ EAST FAIRVIEW INDUSTRIAL
- ☐ EAST SHEPARD INDUSTRIAL
- ☒ EAU CLAIRE
- ☐ EDMONT
- ☐ ELBOW PARK

Most Popular Origin-Destination Pairs

Start Community	End Community	Total Distance Traveled (m)
BELTLINE	BELTLINE	84697183
DOWNTOWN COMMERCIAL CORE	DOWNTOWN COMMERCIAL CORE	43230500
BELTLINE	DOWNTOWN COMMERCIAL CORE	35020213
DOWNTOWN COMMERCIAL CORE	BELTLINE	33462118
EAU CLAIRE	EAU CLAIRE	25315378
SUNNYSIDE	SUNNYSIDE	16352096
Total		885998540

Trips Ending in Destination



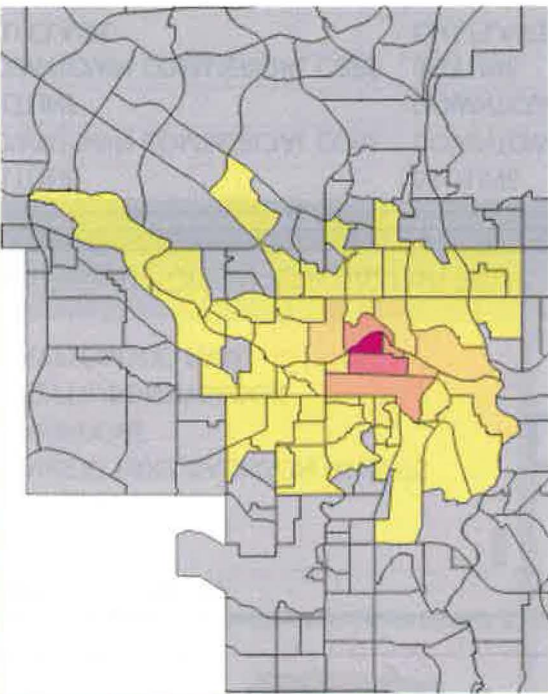
Destination Business Licenses

Business Type	Number of Licenses
RETAIL DEALER - PREMISES	6504
FOOD SERVICE - PREMISES (SEATING)	2895
FOOD SERVICE - PREMISES	2113
WHOLESALE	1883
PERSONAL SERVICE	1527
MANUFACTURER	1479
ALCOHOL BEVERAGE SALES (RESTAURANT)	1242
Total	30752

Total Travel (m) by Origin Community



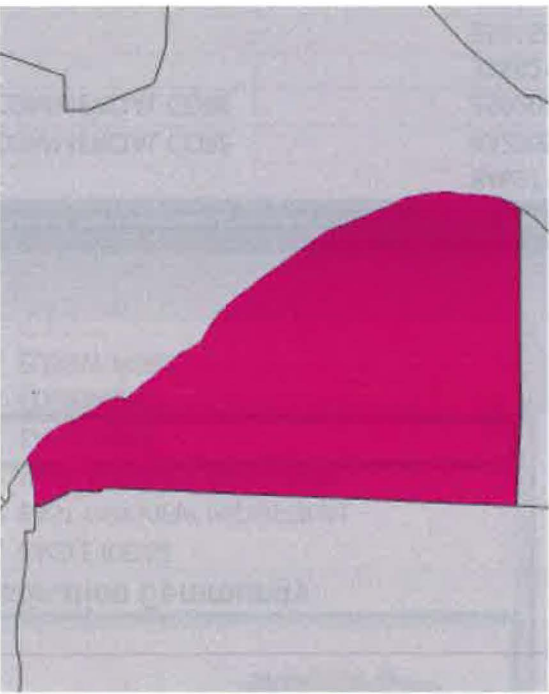
Travel by Origin



Origin Community

- ☐ CANADA OLYMPIC PARK
- ☐ CANYON MEADOWS
- ☐ CAPITOL HILL
- ☐ CARRINGTON
- ☐ CASTLERIDGE
- ☐ CEDARBRAE
- ☐ CHINATOWN

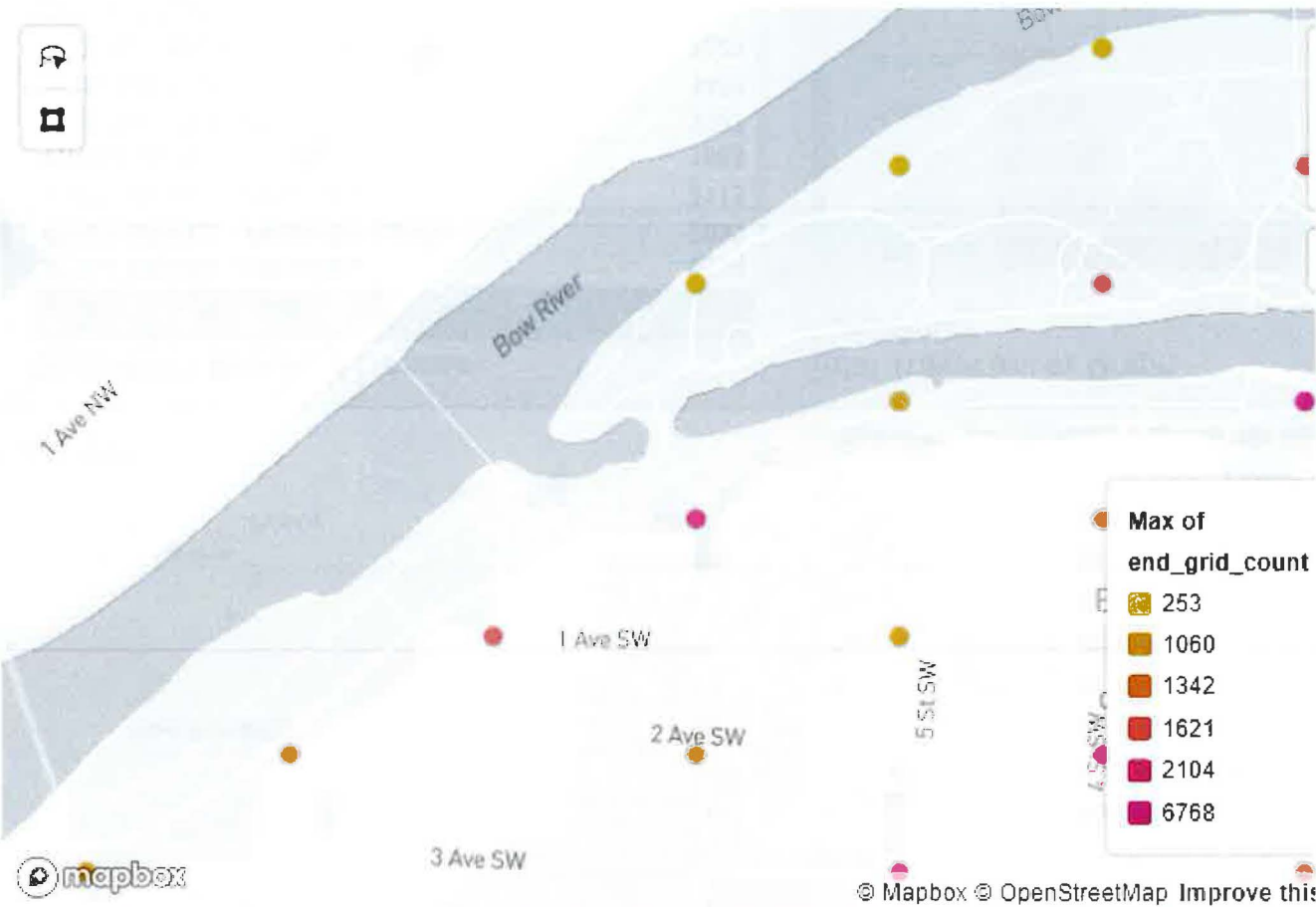
Travel by Destination



Destination Community

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- ☐ EAST SHEPARD INDUSTRIAL
- ☒ EAU CLAIRE
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- ☐ ELBOW PARK

Trips Ending in Destination



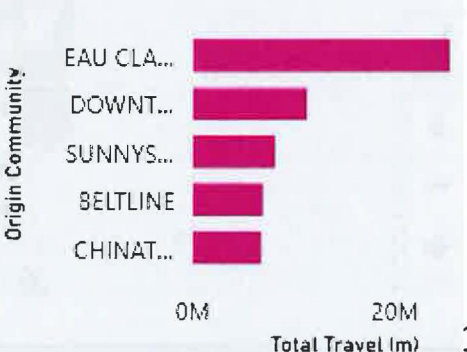
Most Popular Origin-Destination Pairs

Start Community	End Community	Total Distance Traveled (m)
EAU CLAIRE	EAU CLAIRE	25315378
DOWNTOWN COMMERCIAL CORE	EAU CLAIRE	11263693
SUNNYSIDE	EAU CLAIRE	8086175
BELTLINE	EAU CLAIRE	6881550
CHINATOWN	EAU CLAIRE	6719397
DOWNTOWN EAST VILLAGE	EAU CLAIRE	3988124
Total		76472658

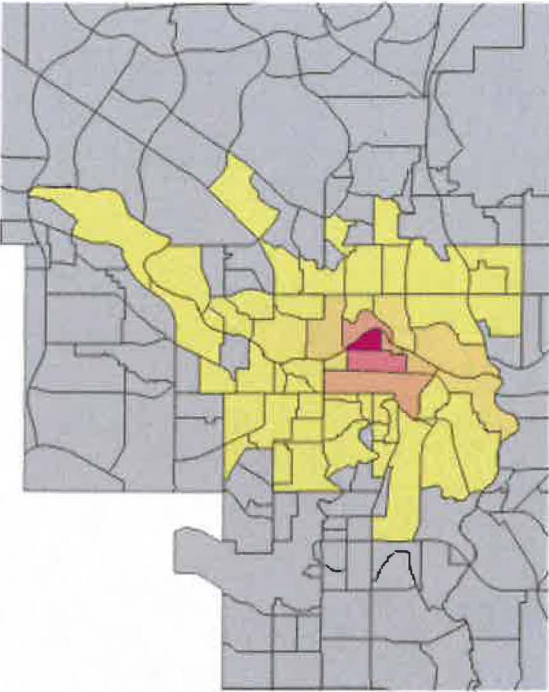
Destination Business Licenses

Business Type	Number of Licenses
RETAIL DEALER - PREMISES	40
FOOD SERVICE - PREMISES (SEATING)	18
FOOD SERVICE - PREMISES (NO SEATING)	17
OUTDOOR PATIO	15
ALCOHOL BEVERAGE SALES (RESTAURANT)	12
FOOD SERVICE - PREMISES	11
PERSONAL SERVICE	7
Total	171

Total Travel (m) by Origin Community



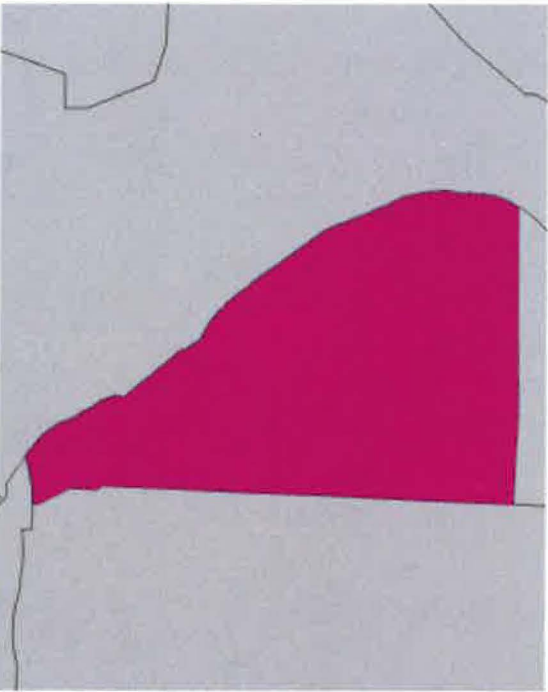
Travel by Origin



Origin Community

- CANADA OLYMPIC PARK
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- CAPITOL HILL
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- CHINATOWN

Travel by Destination



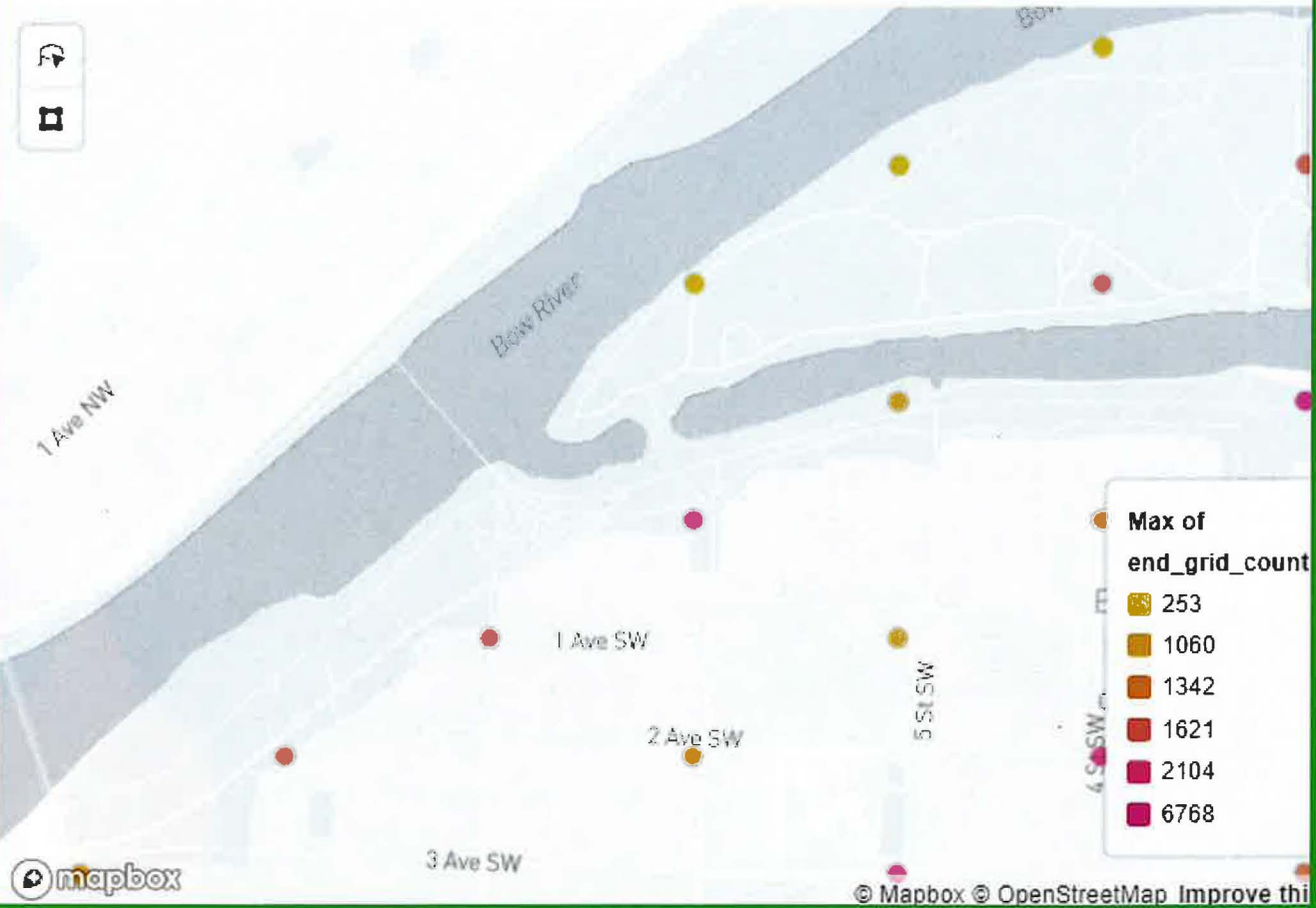
Destination Community

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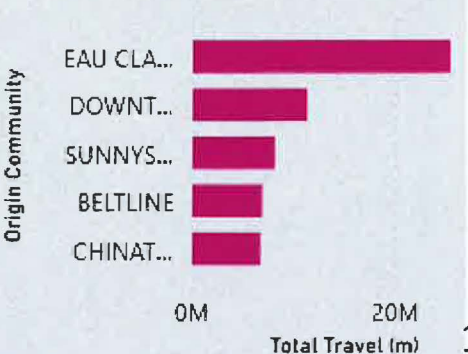
Trips Ending in Destination



Destination Business Licenses

Business Type	Number of Licenses
RETAIL DEALER - PREMISES	40
FOOD SERVICE - PREMISES (SEATING)	18
FOOD SERVICE - PREMISES (NO SEATING)	17
OUTDOOR PATIO	15
ALCOHOL BEVERAGE SALES (RESTAURANT)	12
FOOD SERVICE - PREMISES	11
PERSONAL SERVICE	10
Total	171

Total Travel (m) by Origin Community



Next Steps

Sep 2020



- Project Initiation
- 2 student groups

Dec 2020



- Further data analysis model development

Apr 2021



- Data-based recommendations

Key Takeaways

Value of Data



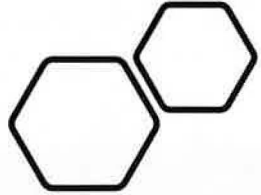
Informed
Decision-Making



Pilot Program
Pioneers



Leader in
Sustainable
Transportation



References

- <https://www.660citynews.com/2019/07/24/lime-scooters-newest-menace-on-city-streets-injury-prevention-expert/>

