

# A picture is worth a thousand words: Telling a better story with data visualizations

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Data Scientist, Bus Speed & Reliability



Together all the way



# TransLink

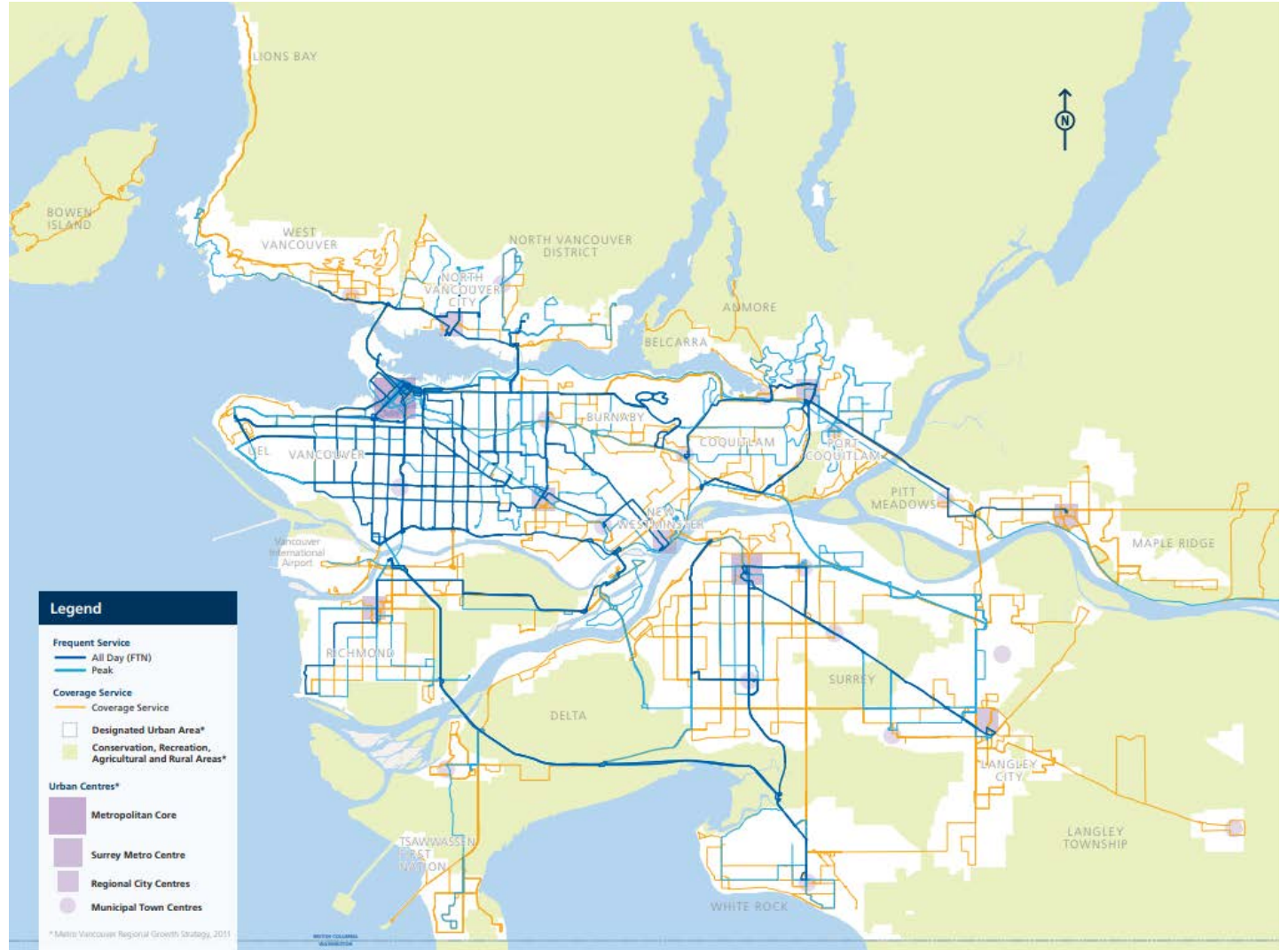
Regional Transportation system of

- 23 Municipalities
- 1,800 km<sup>2</sup>

## CMBC

- 153 Conventional Bus routes
- 70 Community Shuttles

**2018**    437.4M Boardings  
↑ 8.0% Bus Ridership



# Bus Speed & Reliability Program

## Goals

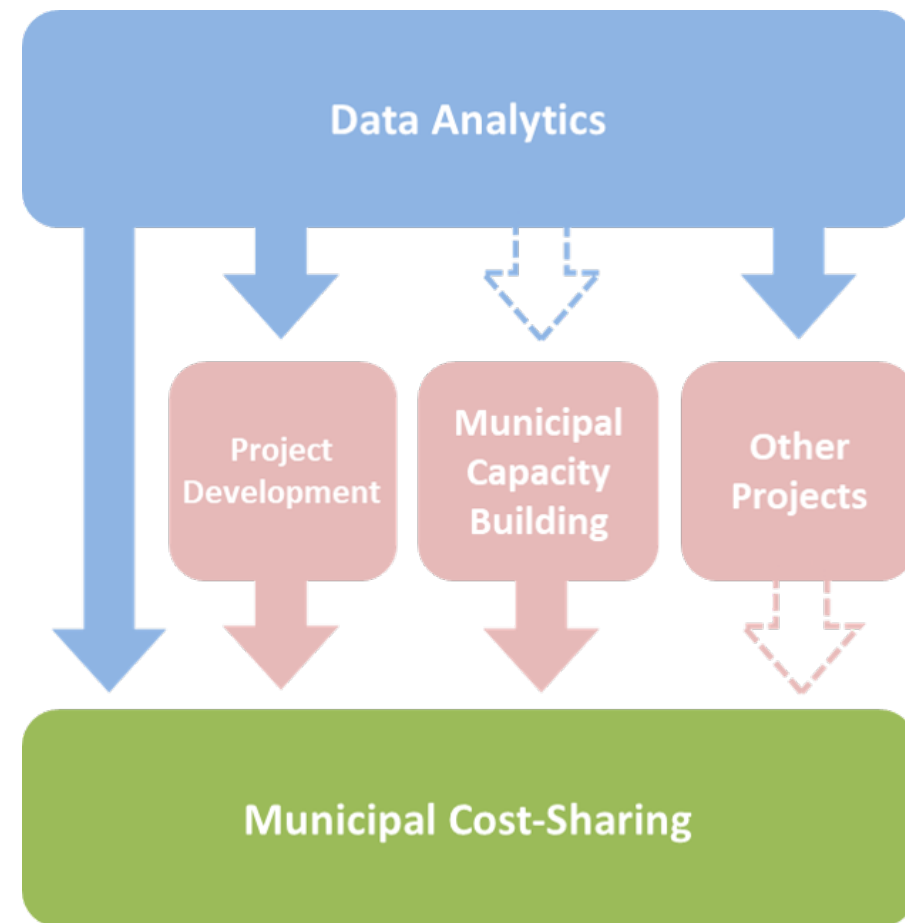
Improve customer experience and cost-effectiveness through faster, more reliable bus service.



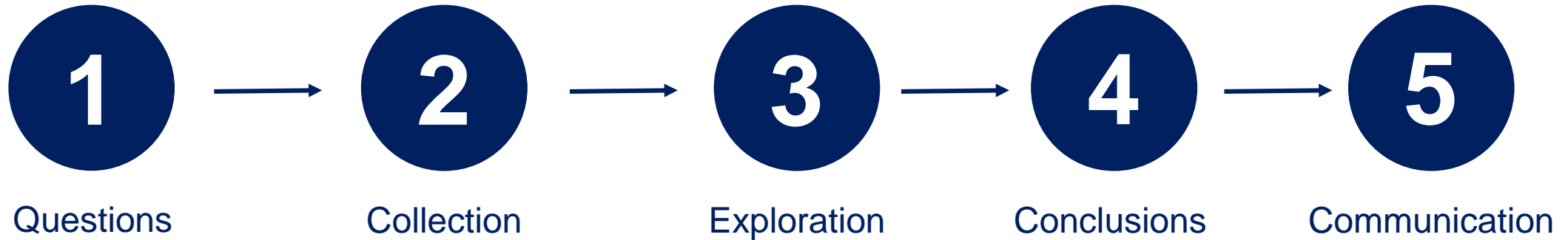
Two-person operation

- Project Manager
- Data Scientist

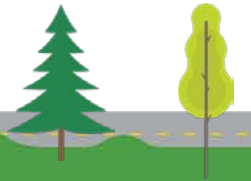
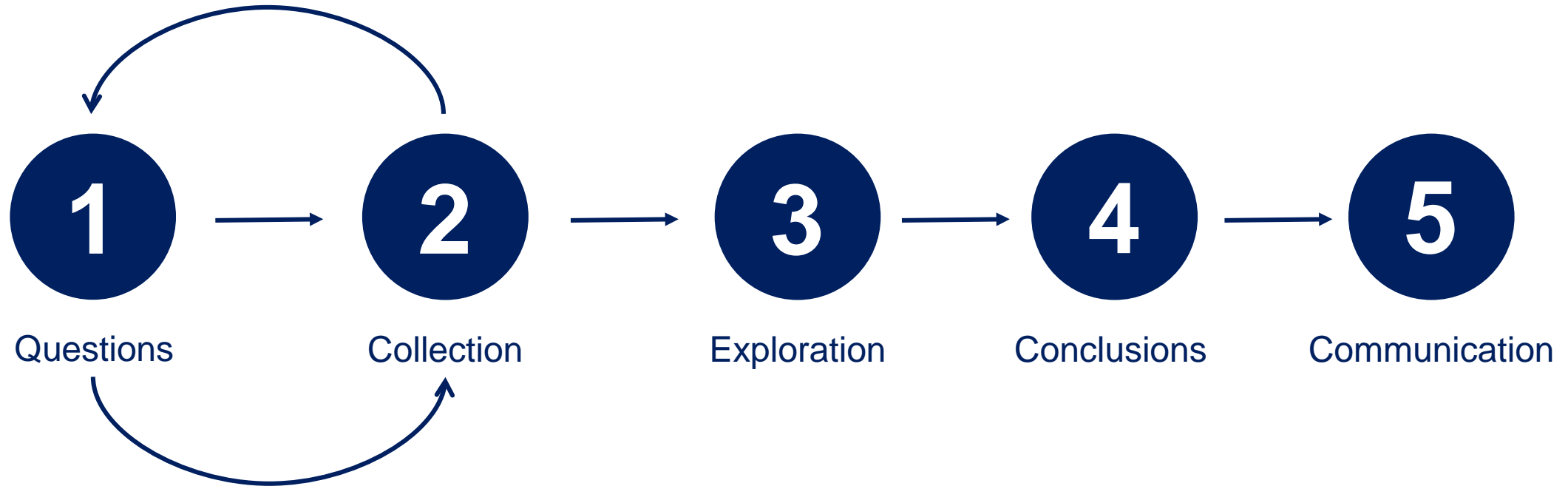
\$16 million budget for four years



# Framing the Analysis Process



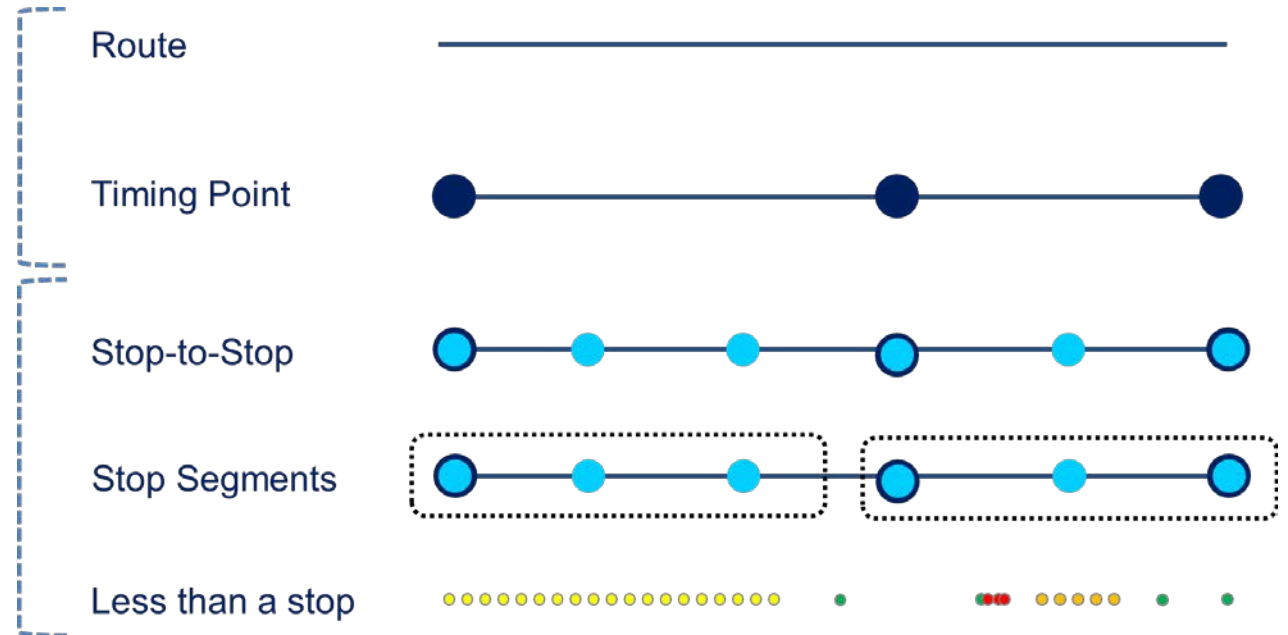
# Framing the Analysis Process



# Questions

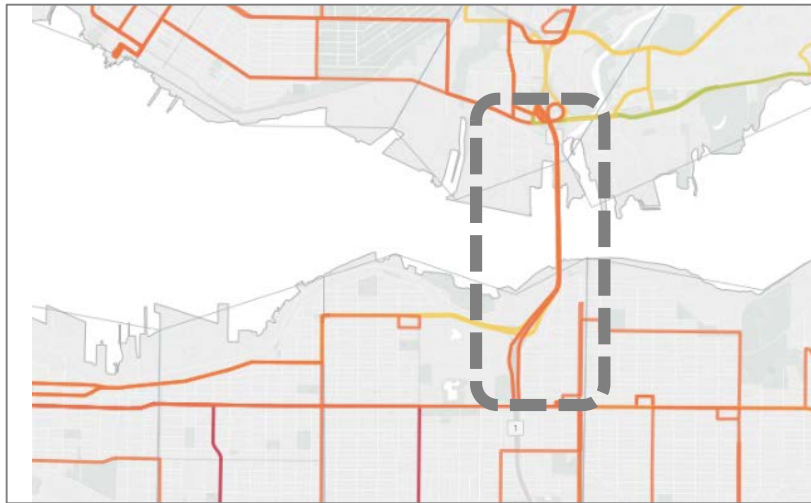
What is the story you are trying to tell?

- **Goal**
- **Audience**
- **Simplify**





# Discussion with municipalities on transit priority over the Second Narrows Bridge.



Route



Stop-to-Stop



Less than Stop




- Once onto the Second Narrows bridge, speeds are relatively fast.
- Loading onto the bridge results in relative slow speeds and increased travel time.

# Questions

What is the story you are trying to tell?

- Goal
- Audience
- **Simplify**

METRICS	CORRIDOR	LINE	SEGMENT	BUS STOP	< BUS STOP
Speed		✓	✓		✓
Travel Time		✓	✓		✓ 
Reliability		✓	✓		
Ridership		✓	✓	✓	
Delay or Person Hours of Delay		✓	✓		
Bus Bunching or Gapping		✓		✓	
On Time Performance		✓		✓	



Manual



Dashboard



Coming Soon



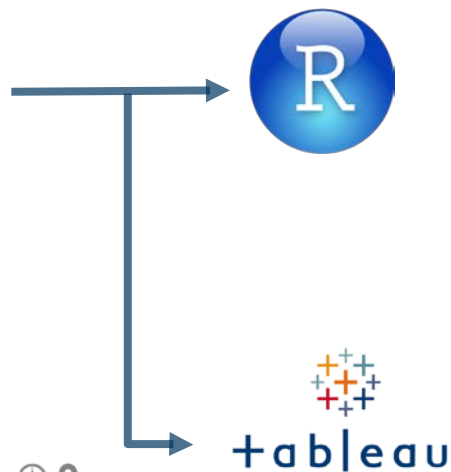


# Collection

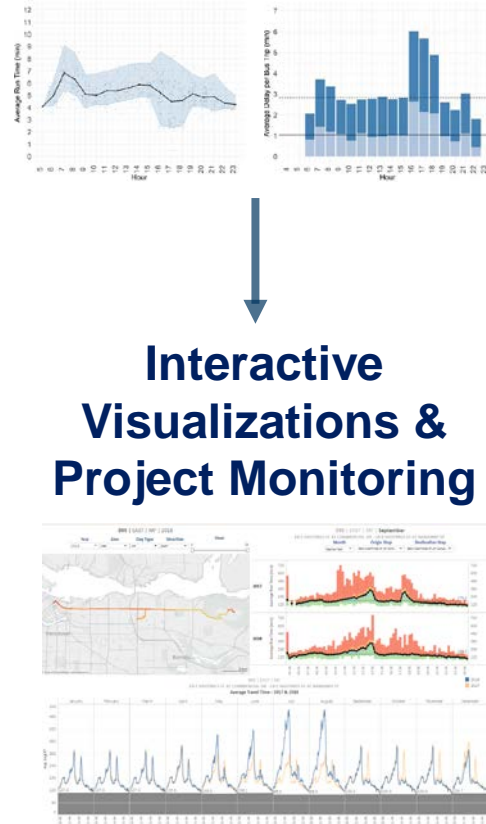
## Data Source



## Prepare

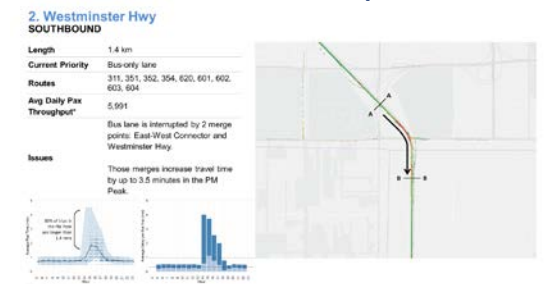


## Adhoc Analysis

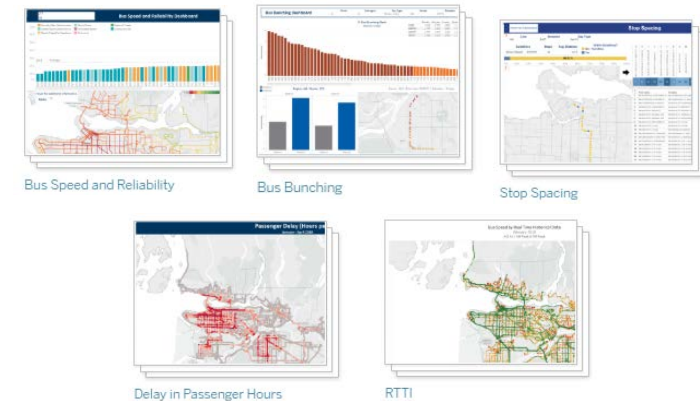


## Publish

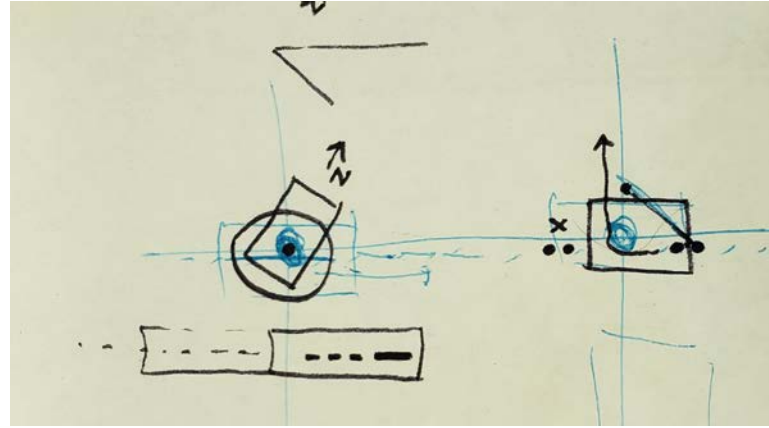
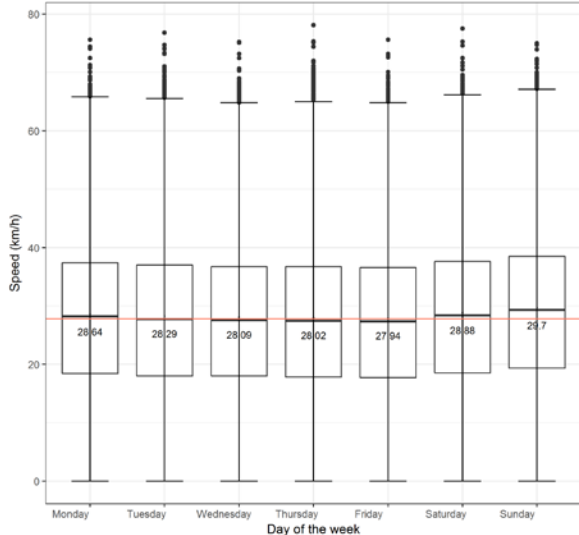
### Presentations/Reports



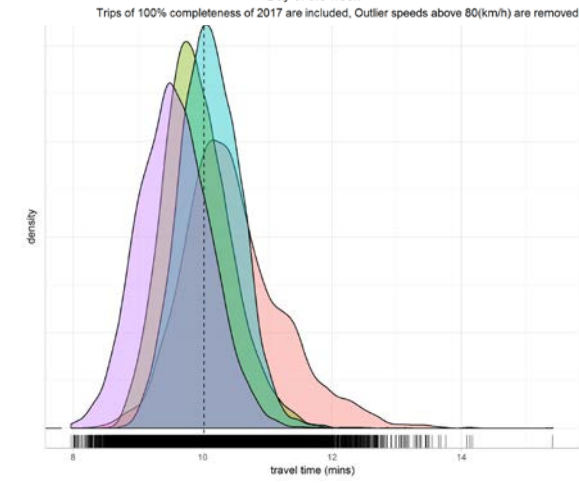
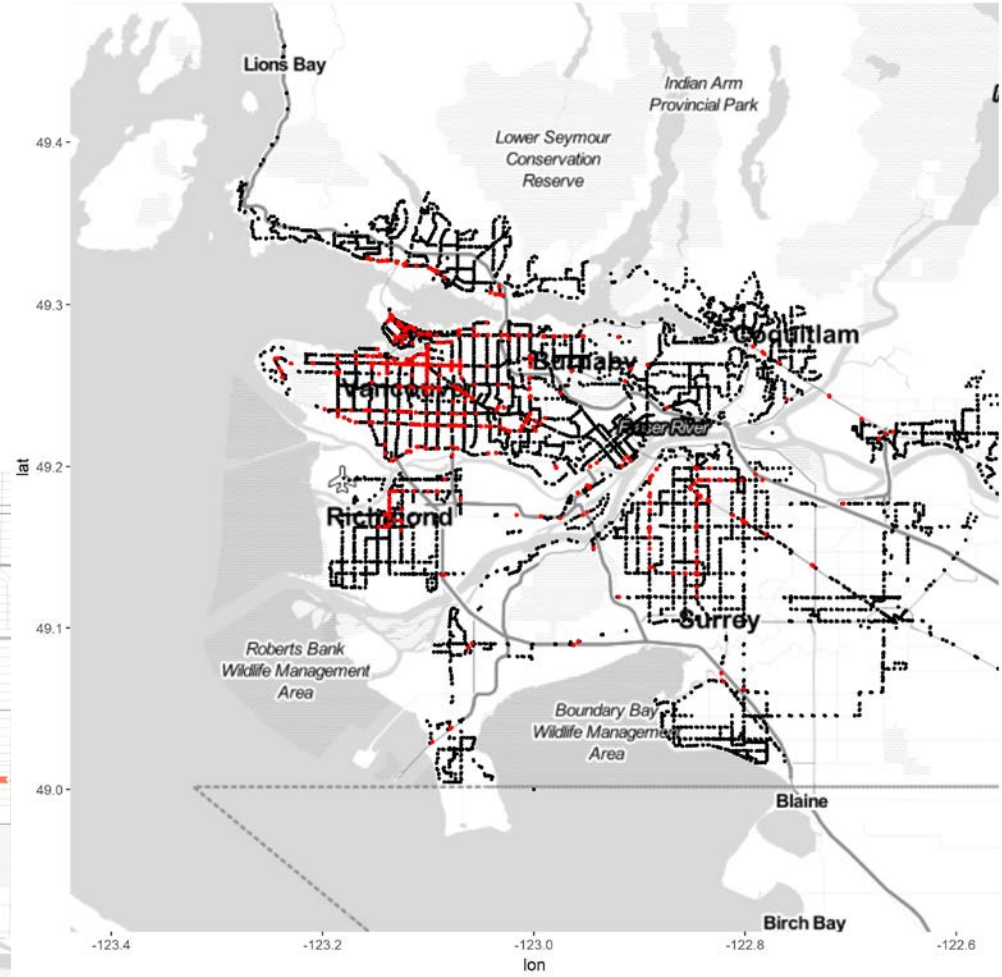
### Tableau Server



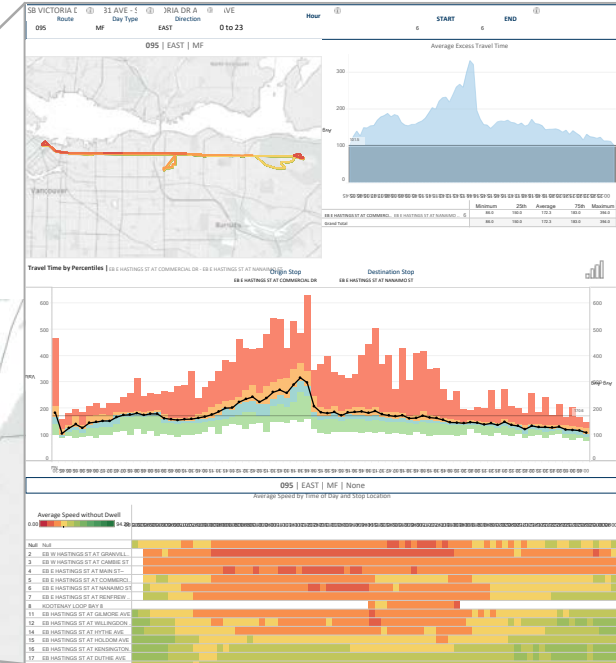
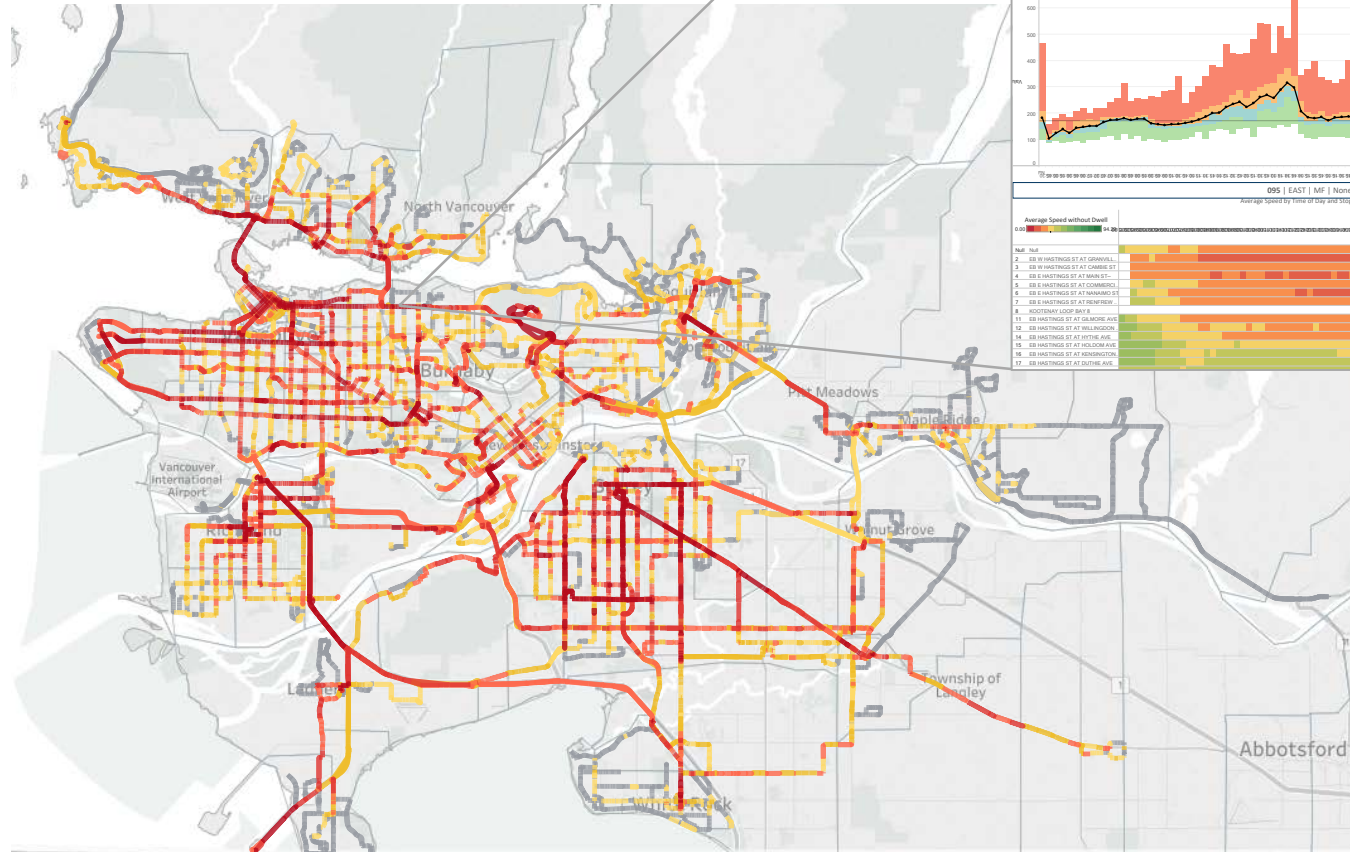
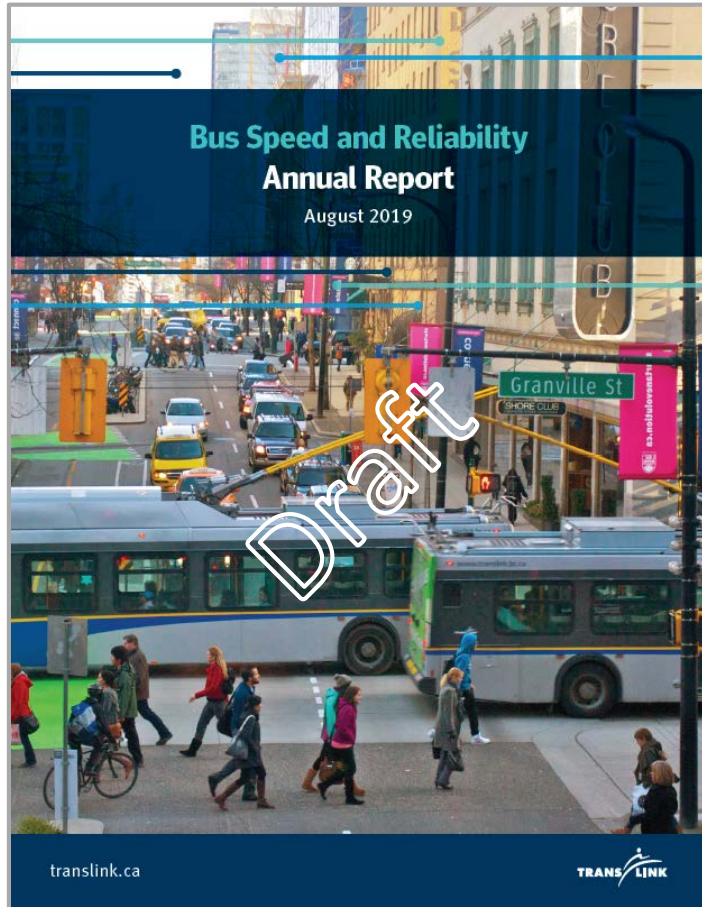
# Exploration



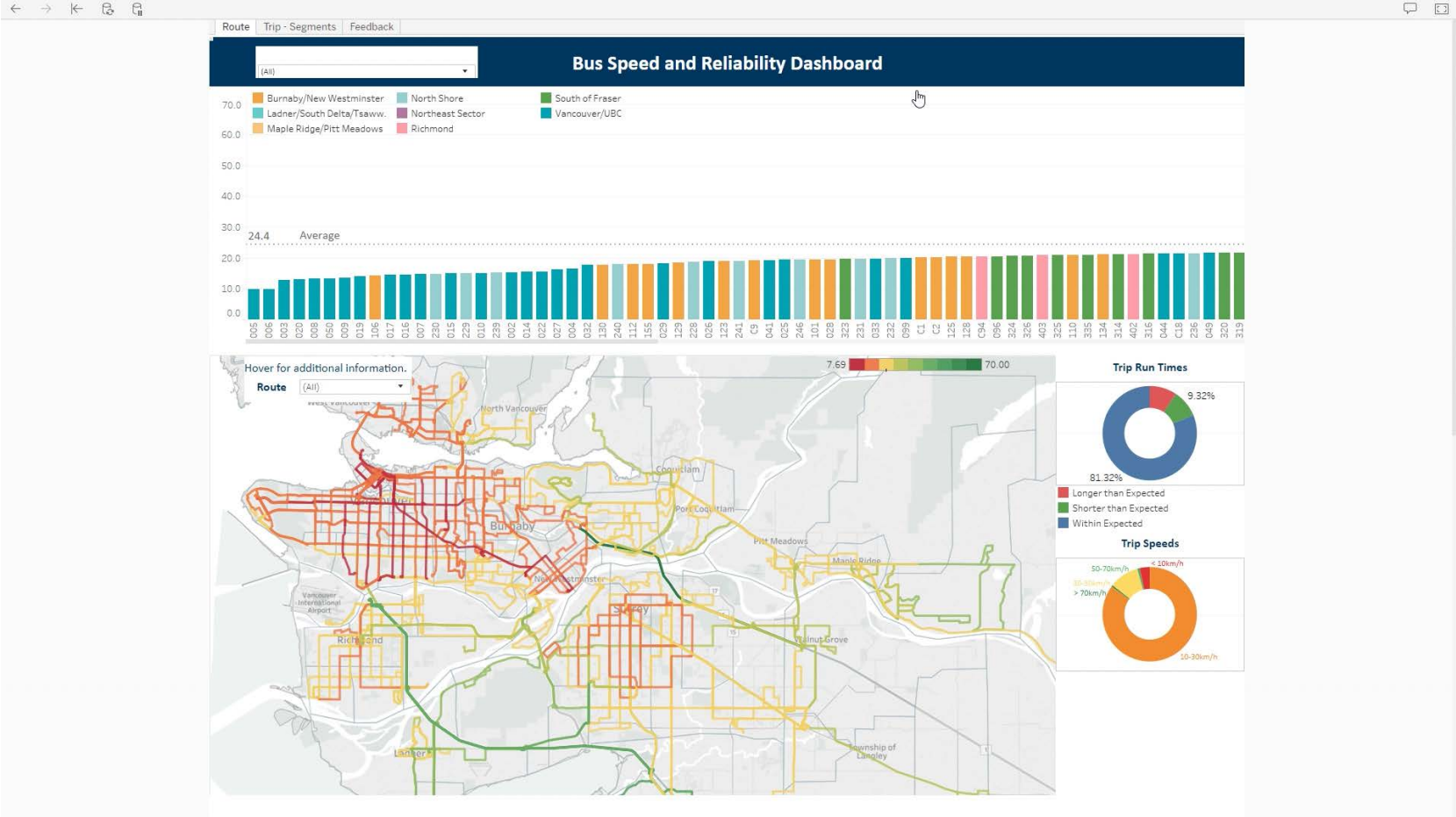
WEST UBC to Dunbar - PM Peak



# Conclusions & Communication



# Dashboard Walk-Through



Together all the way





# Burnaby and Vancouver are considering extending transit priority lanes across Hastings.

## Data

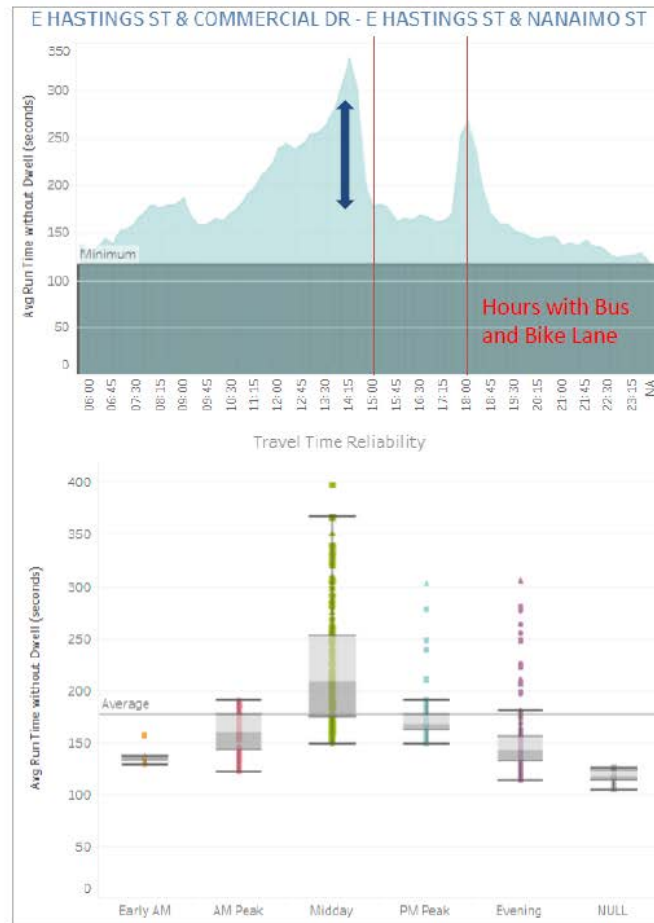
HOV Lanes seen along Hastings through Burnaby offer little benefit to transit travel time compared to hours without parking restrictions.



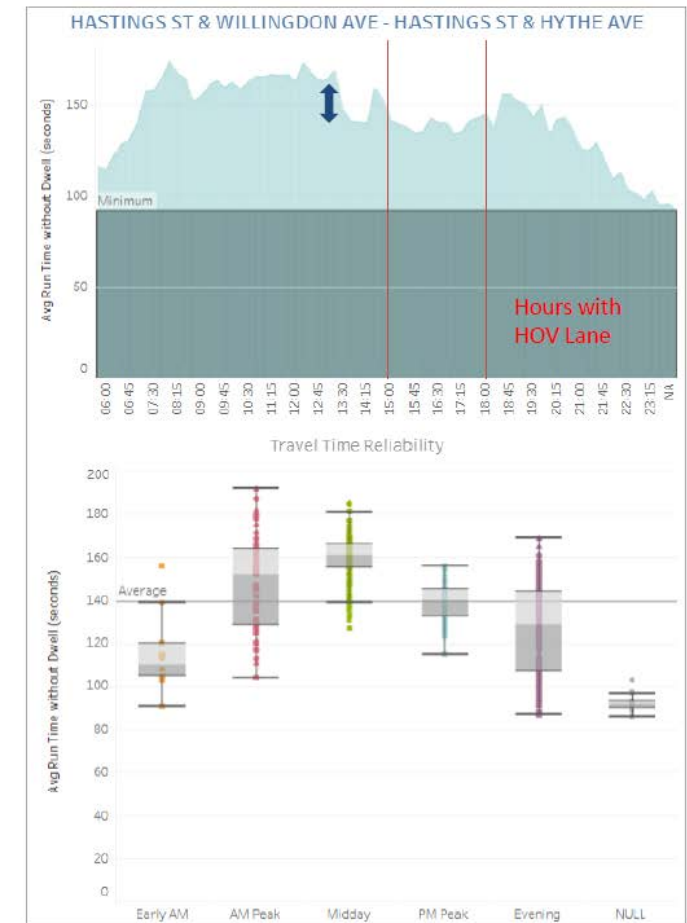
## Recommendation

1. ↑ Hours of Parking Restrictions
2. Extend hours of Priority
3. Convert HOV → Bus Only

### VANCOUVER

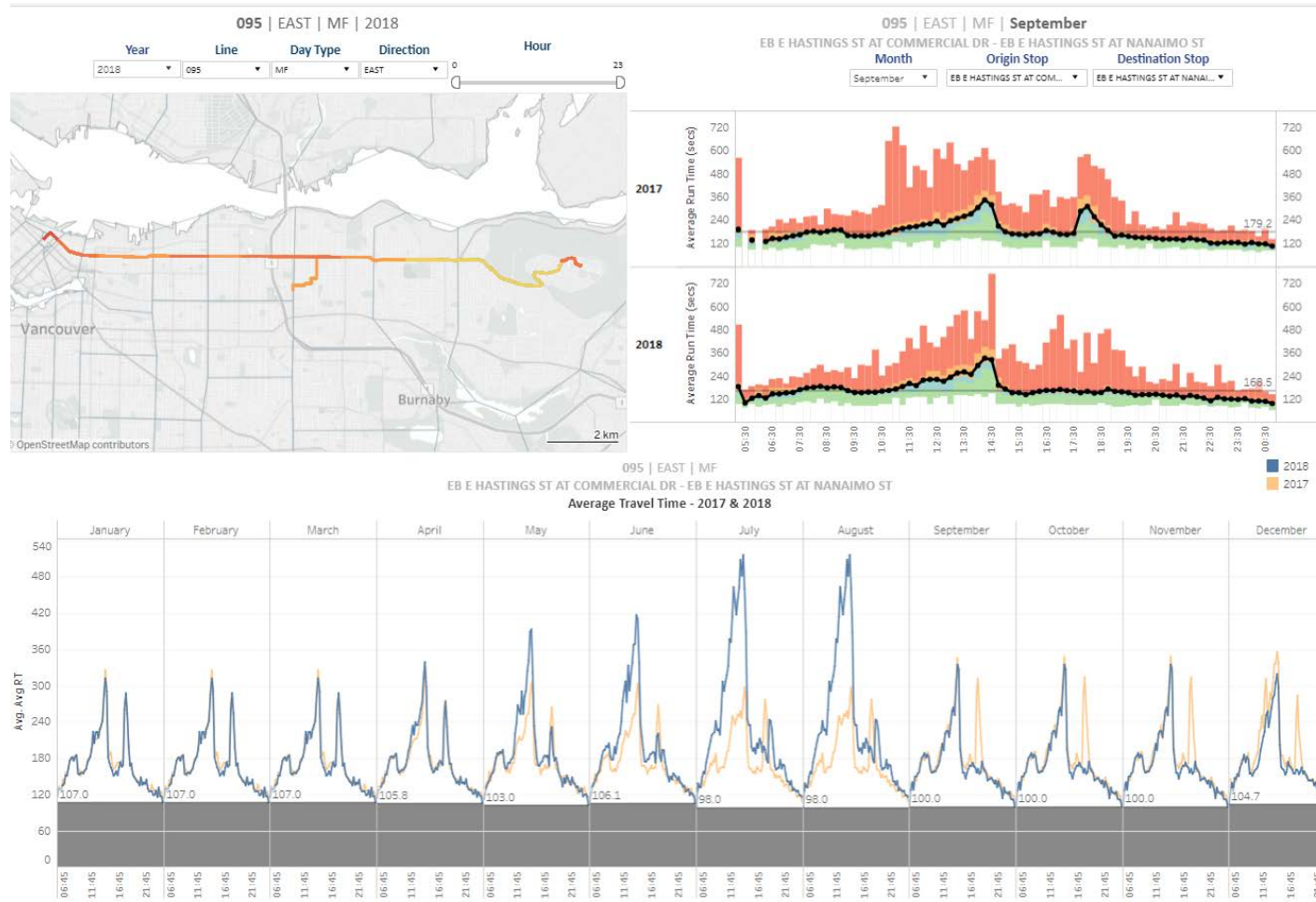


### BURNABY





# Monitor Specific Projects: Extending Transit Priority Lane hours across Vancouver



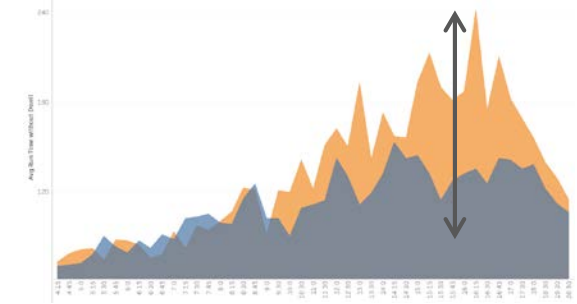


# Confirming Operator Comments

“We have received a number of reports from customers and bus operators regarding traffic delay at the left turn from NB Scott Road to WB 84<sup>th</sup> Avenue”



2018 2019



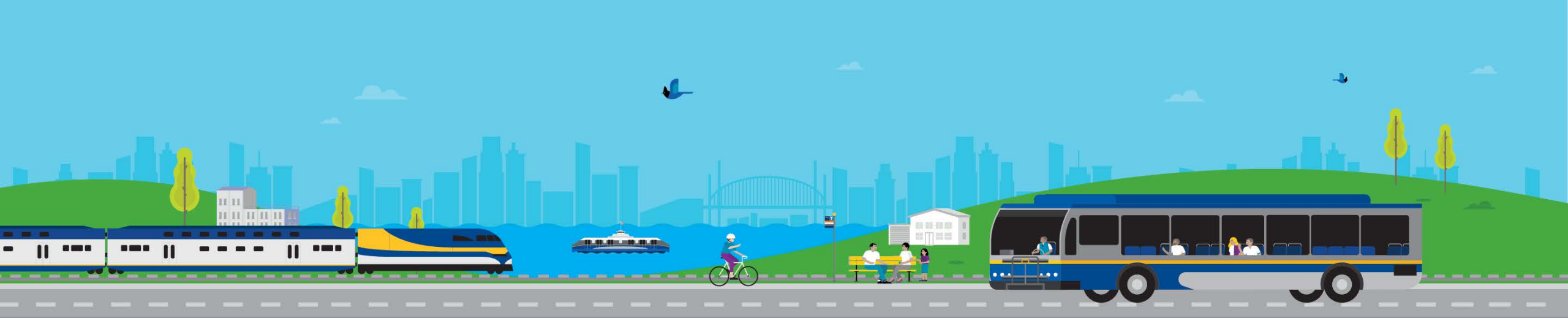
- BSR Program funded a Left-Turn Signal at this intersection
- Saving almost 2 minutes during the worst time of day, an average of 45-75 seconds on other trips.

# Data — Story → Information

1. Identify and Prioritize Metrics
2. Flexible analysis structure and tools
3. Develop Partnerships







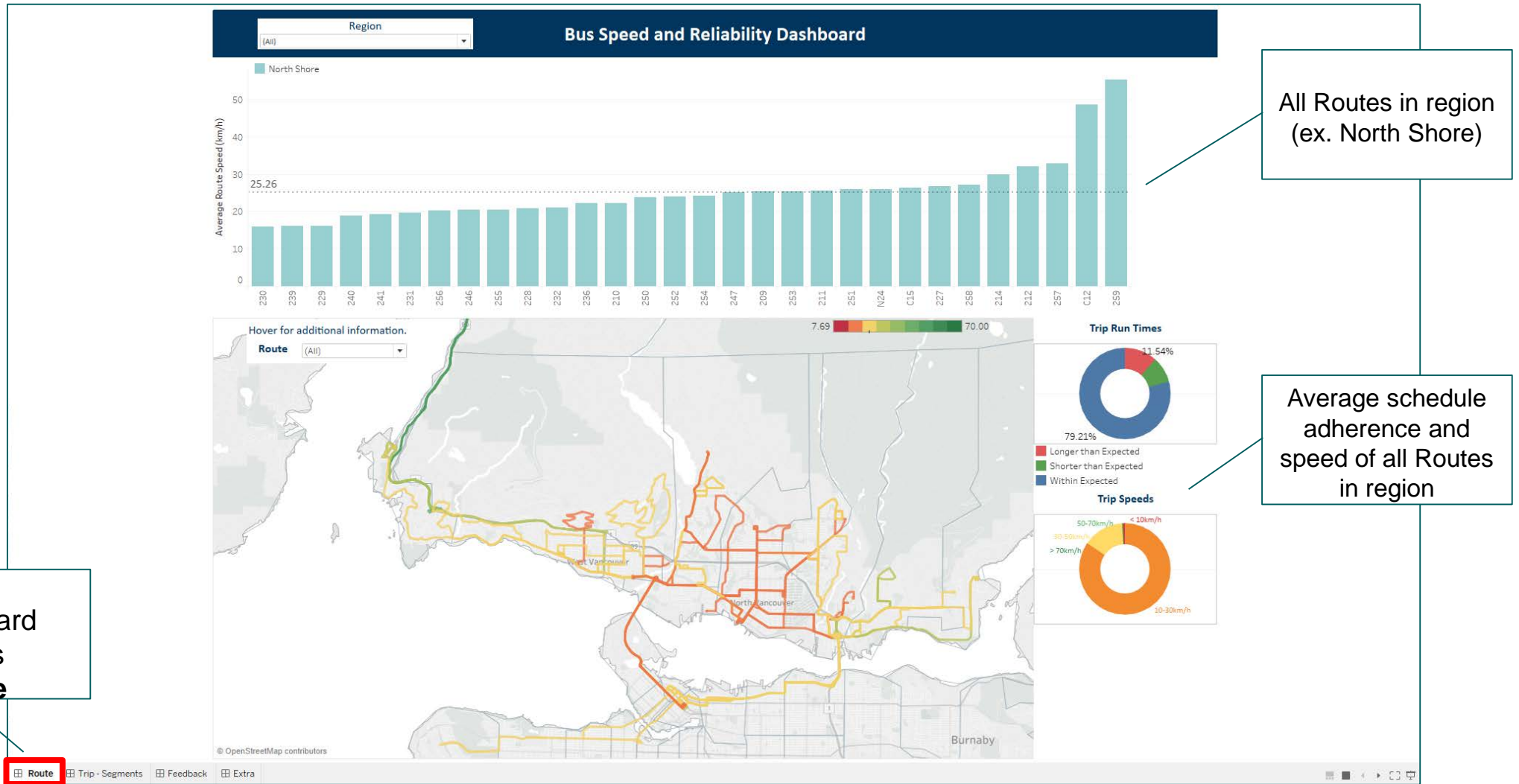
# REFERENCE



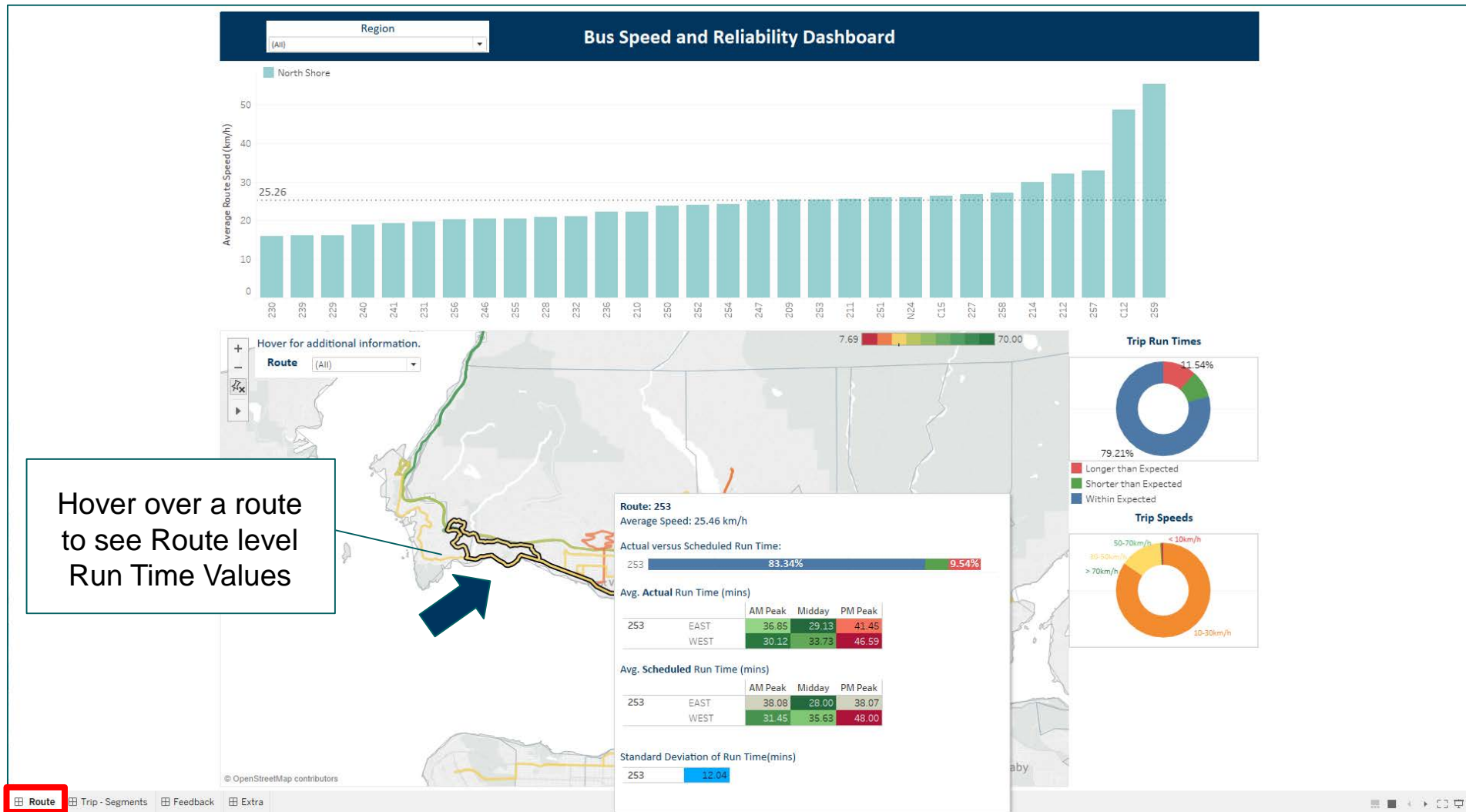
Together all the way



# Route



# Route



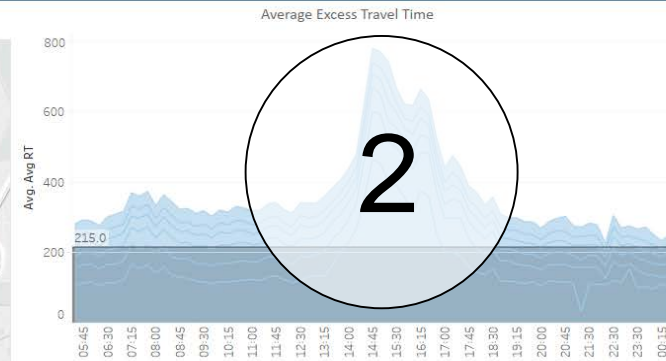
Hover over a route to see Route level Run Time Values

# Trip - Segments

Filter  
s

Route: 239 | Day Type: MF | Direction: EAST | Hour: 0 to 23 | START: 19 | END: 24

239 | EAST | MF

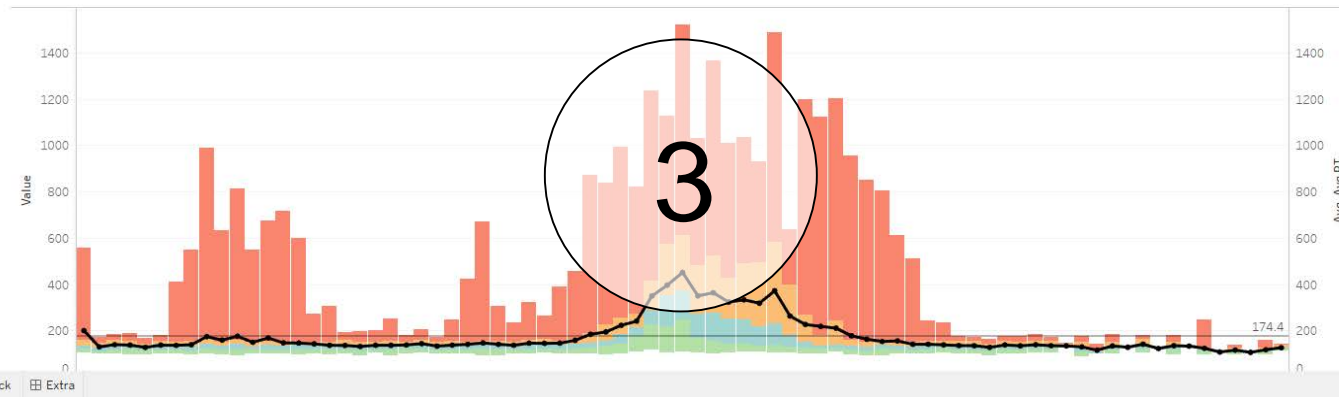


	Minimum	25th	Average	75th	Maximum
EB COTTON RD AT BROOKSBANK AVE	24	25	34	67	216
EB E 3 ST AT LONSDALE AVE	19	19	38	41	70
EB E 3 ST AT MOODY AVE	23	117	134	197	514
EB E 3 ST AT RIDGEWAY AVE	24	83	139	202	583
EB E 3 ST AT MOODY AVE	22	17	23	29	57
EB E 3 ST AT MOODY AVE	23	12	22	28	63

Travel Time by Percentiles  
EB E 3 ST AT MOODY AVE-EB COTTON RD AT BROOKSBANK AVE

Origin Stop: EB E 3 ST AT MOODY AVE | Destination Stop: (All)

Dashboard Views  
Trip - Segments



Route | Trip - Segments | Feedback | Extra



# Speed Map

## What is Shown

Average transit speed between bus stops.

## How to Read

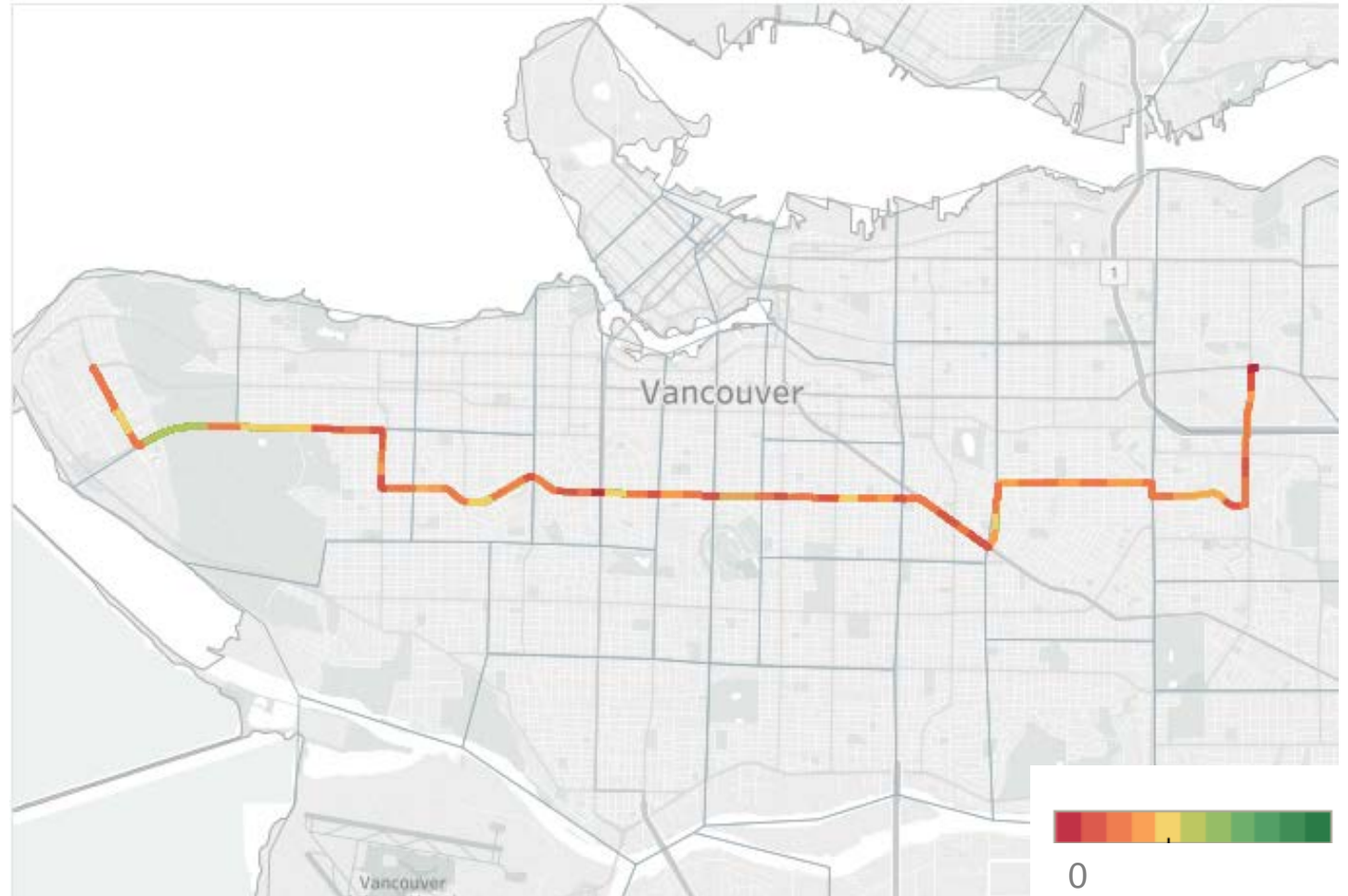
Colour indicates average transit speed between bus stops.

- Green: Relatively fast/free-flowing.
- Red: Relatively slow, area of potential

## Note

Only shows average speed. Does not indicate potential reliability issues (variation of speed).

025 | EAST | MF



## What is Shown

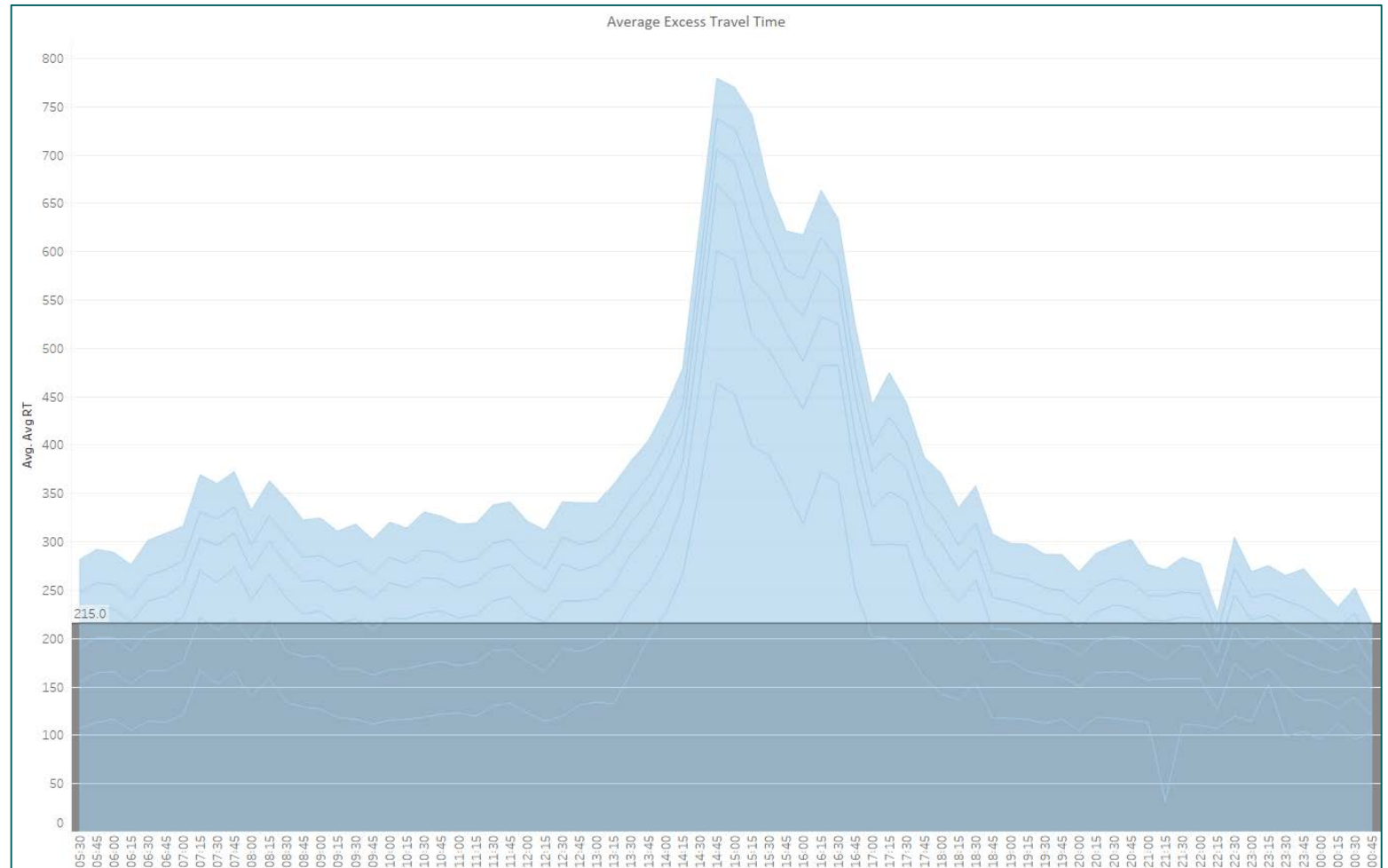
Sum of average travel time (y-axis) of chosen segments across 15-minute increments of the day (x-axis).

## How to Read

- **Light Blue** – Possible Time Savings:  
Average observed travel time for each trip attributable to various forms of delay, slow speeds in traffic, etc.
- **Gray** – Baseline:  
Average minimum travel time throughout the day. This is used as a proxy to estimate free-flow traffic.

## Note

Only shows average travel time.  
Does not indicate potential reliability issues (variation of travel time).



## Travel Time by Percentile Group

### What is Shown

Travel time (y-axis) of chosen segments across 15-minute increments of the day (x-axis) by 25<sup>th</sup>, 50<sup>th</sup> (median), 75<sup>th</sup> and 100<sup>th</sup> (maximum).

### How to Read

Each percentile group represents travel time of ¼ of trips through a specific stop segment.

Average travel time is shown by ●—●—●—●—●

