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# City of Vancouver Subarea Model Development

*RTM Stakeholder Meeting*

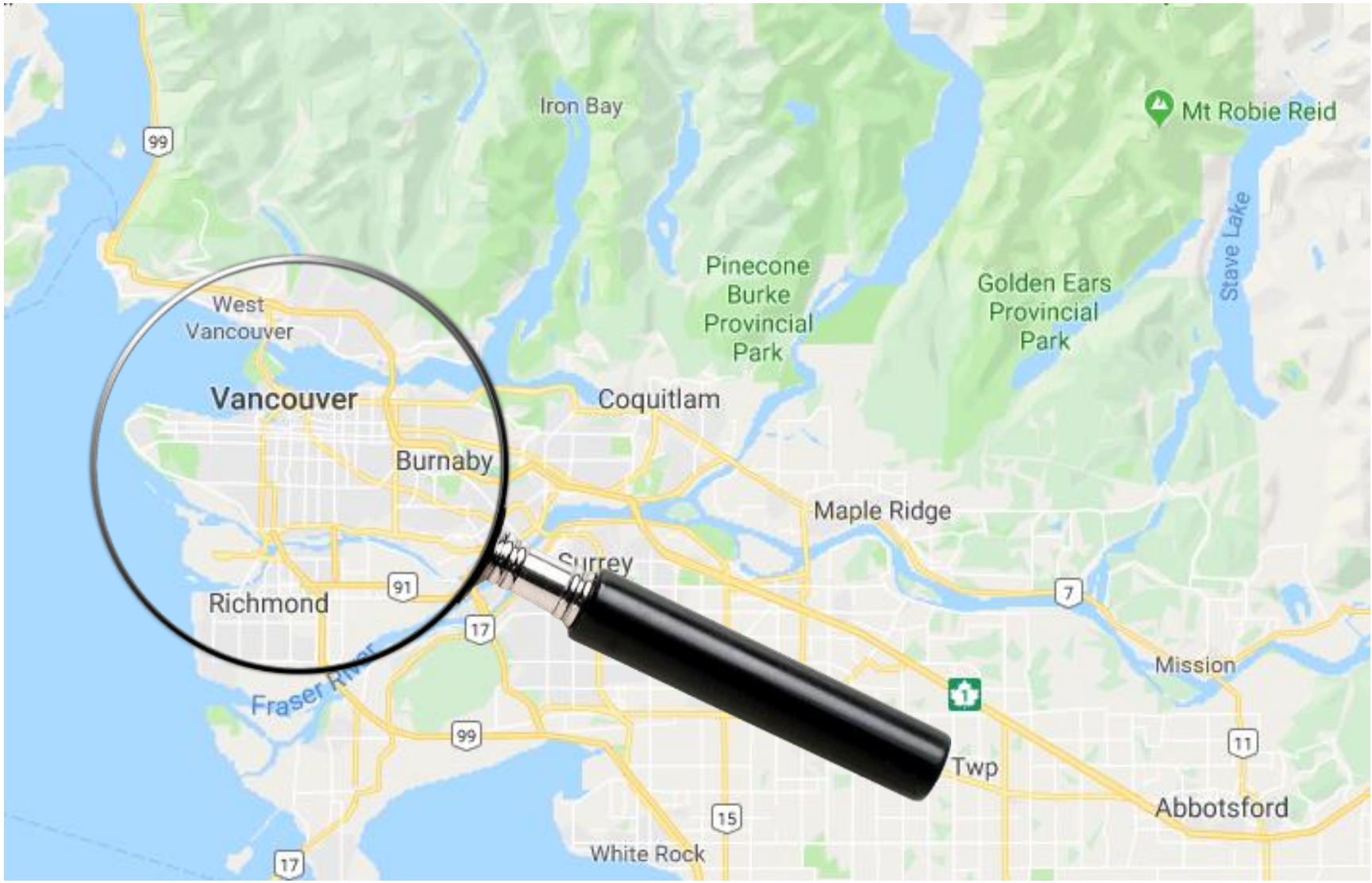
October 28, 2019

# Purpose

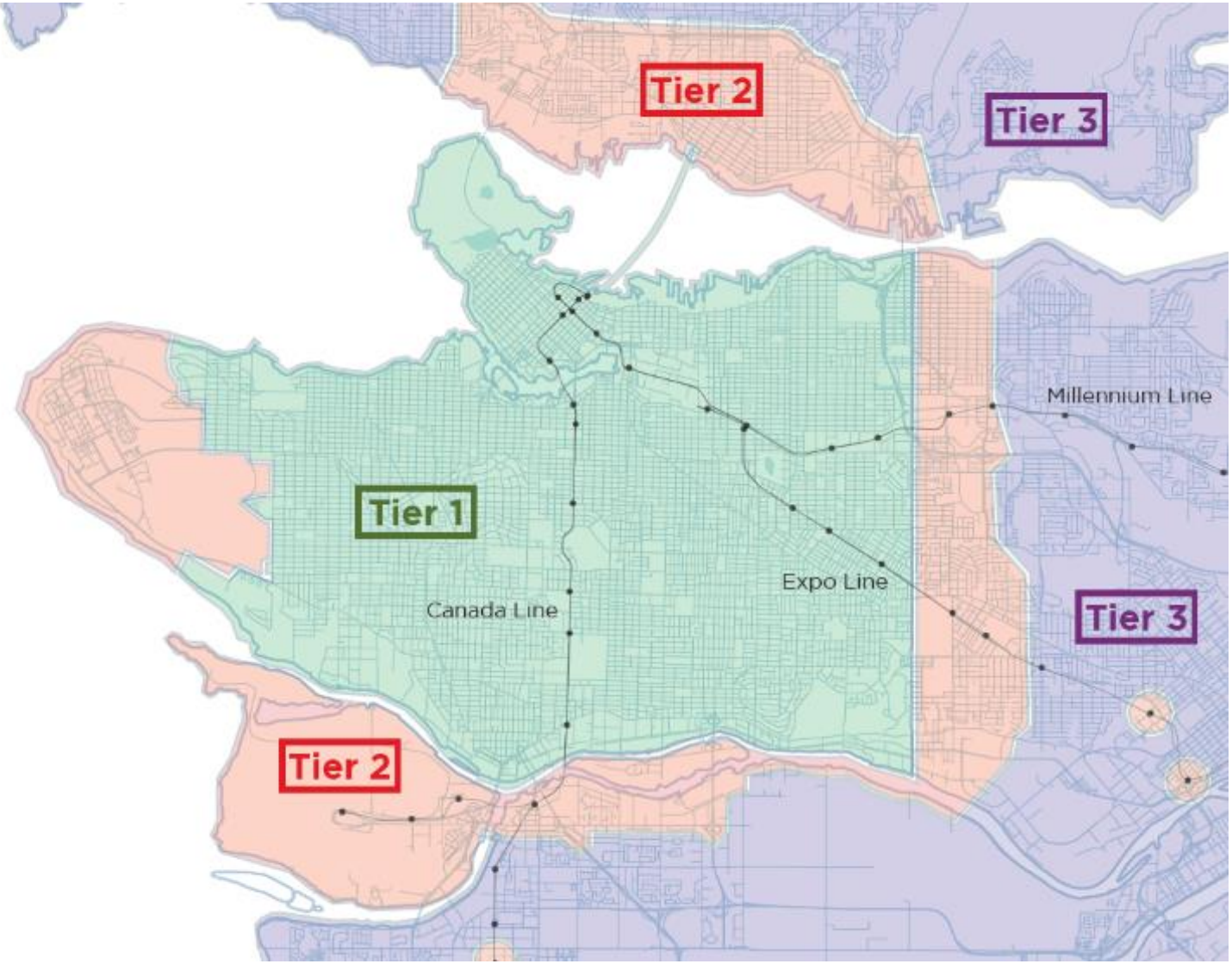
RTM focuses on regional travel behaviours

- Travel behaviour and decision making process are based on aggregated totals
- Outputs are designed for high-level analyses
- Regional zones are relatively large in size
- Local conditions may be overlooked due to regional focus
- Lower class roads typically not modelled
- Detailed outputs at the zonal level, link level, and line level may require additional validation

# Purpose


Iron Bay
Mt Robie Reid
Pinecone Burke Provincial Park
Golden Ears Provincial Park
Stave Lake
West Vancouver
Vancouver
Coquitlam
Burnaby
Maple Ridge
Surrey
Richmond
Fraser River
Mission
Twp
Abbotsford
White Rock
99
91
17
7
1
11
15

# Scope


Tier 2
Tier 3
Millennium Line
Tier 1
Expo Line
Canada Line
Tier 3
Tier 2

# Purpose

## Zone Disaggregation

- Smaller zones
  - Refined trip origins & destinations
  - Better representation of transit-orientated development
  - Better representation of walking and cycling travel distances

## Network Refinement

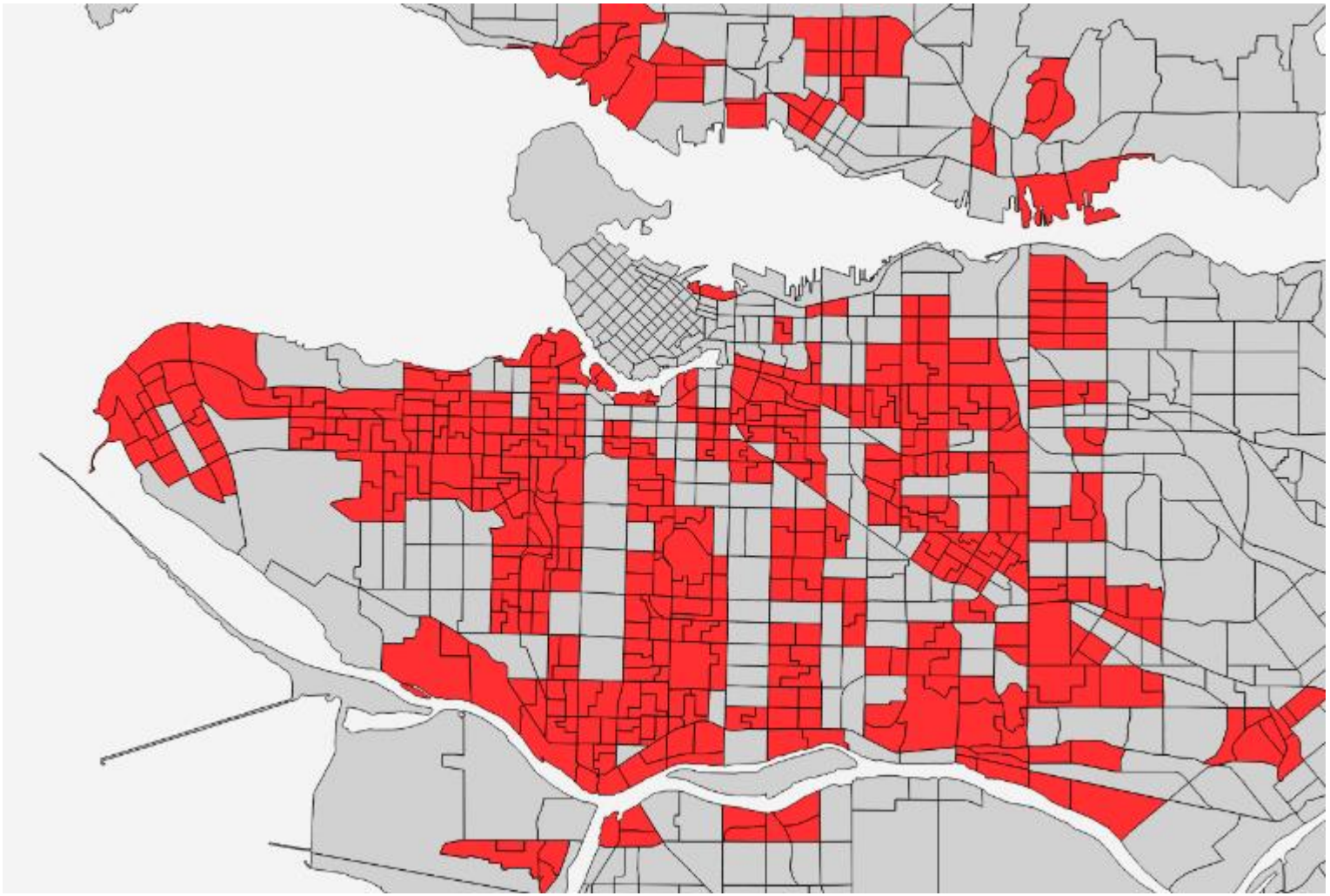
- Zone Centroids and Connectors
- Transit Network Refinement
- Road Network Refinement

## Calibration and Validation

- Daily
  - Trips by Mode
- Peak Hours
  - Active Trips Validation
  - Transit Ridership & Travel Time Validation
  - Auto Volume & Travel Time Validation

# Zone Disaggregation

- Subarea Zone Structure



# Zone Disaggregation

- Subarea Zone Structure

| Neighbourhood | RTM | Subarea | Difference |
|---|---|---|---|
| CBD – West End | 36 | 36 | 0 |
| CBD – False Creek | 55 | 56 | +1 |
| Broadway | 37 | 61 | +24 |
| Vancouver South | 48 | 88 | +40 |
| Kerrisdale | 37 | 77 | +40 |
| Kitsilano | 28 | 66 | +38 |
| Vancouver SE | 43 | 65 | +22 |
| Vancouver East | 56 | 102 | +46 |
| Vancouver Port | 32 | 41 | +9 |
| Total Vancouver | 372 | 592 | +220 |

# Network Refinement

1. Break Road Links for Zone Connectors

# Network Refinement

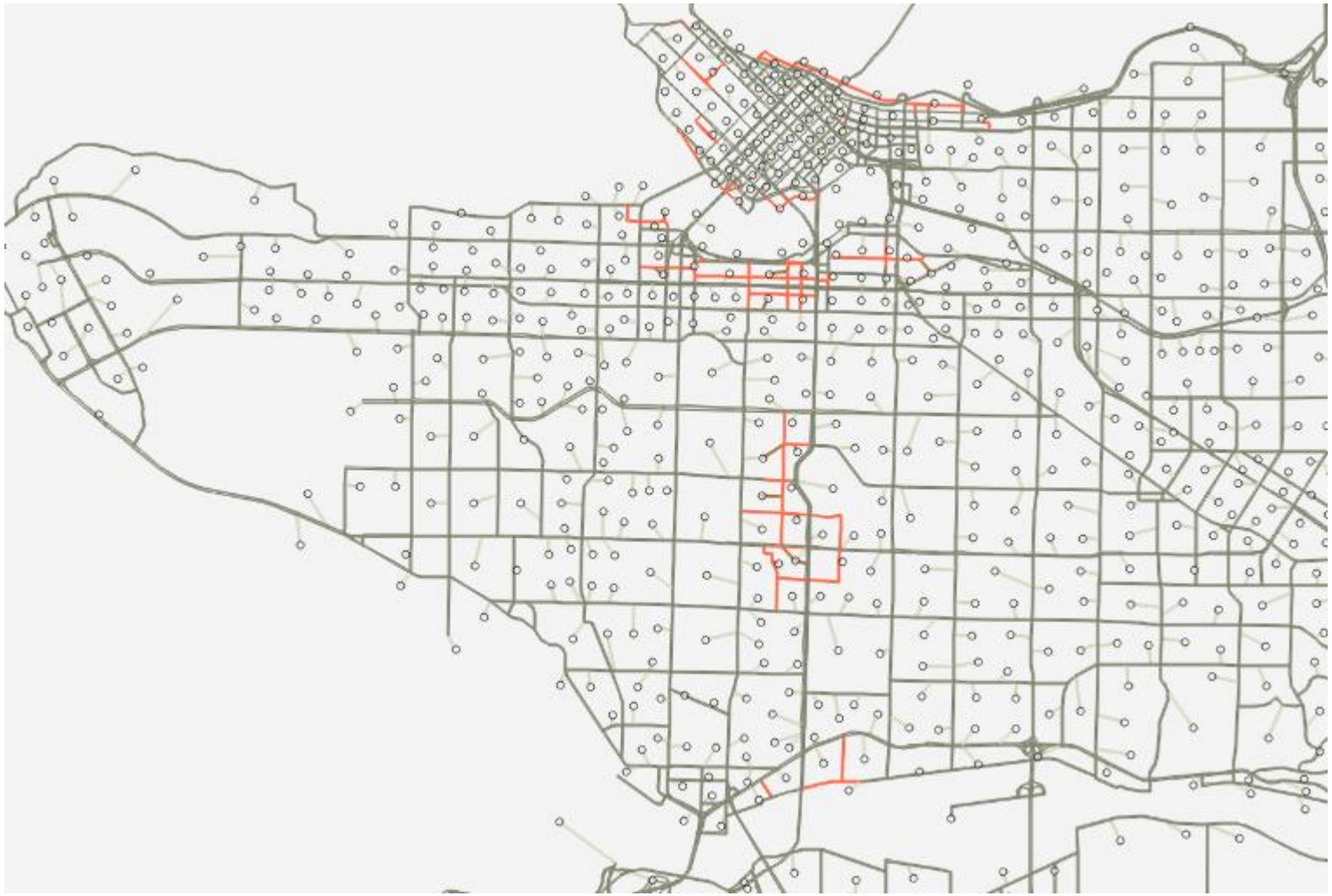
## 2. Add Zone Centroids

# Network Refinement

## 3. Add Zone Connectors

# Network Refinement

## 4. Add Local Roads



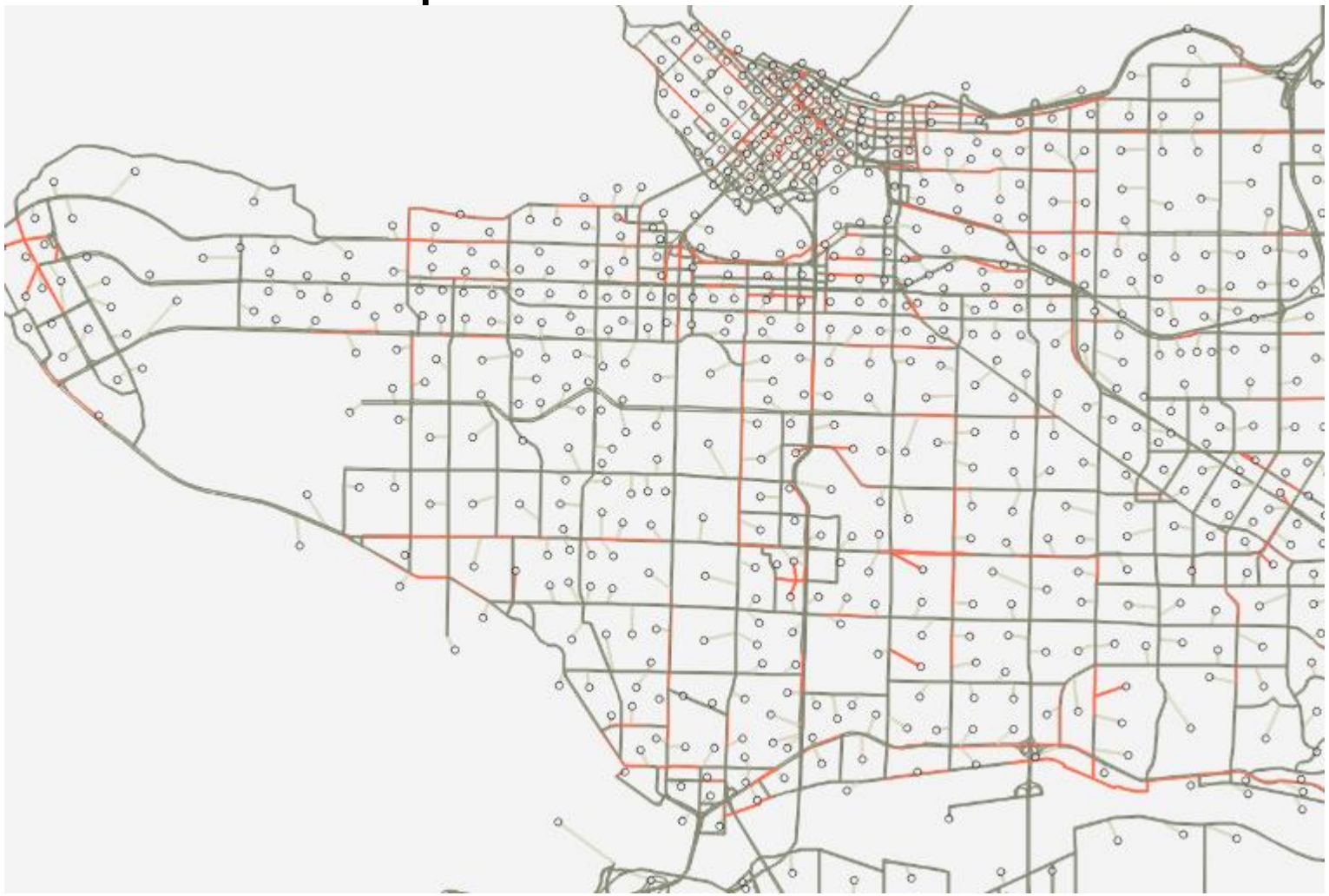
# Network Refinement

5. **Review and Update Road Network**
   - Number of Travel Lanes
   - Approximate Link Capacities based on
     - Intersection Control Type & Approach Laning
   - Posted Speeds
   - Turn Restrictions

HERE Maps utilized to fill in significant gaps in data

# Network Refinement

## 5. Review and Update Road Network

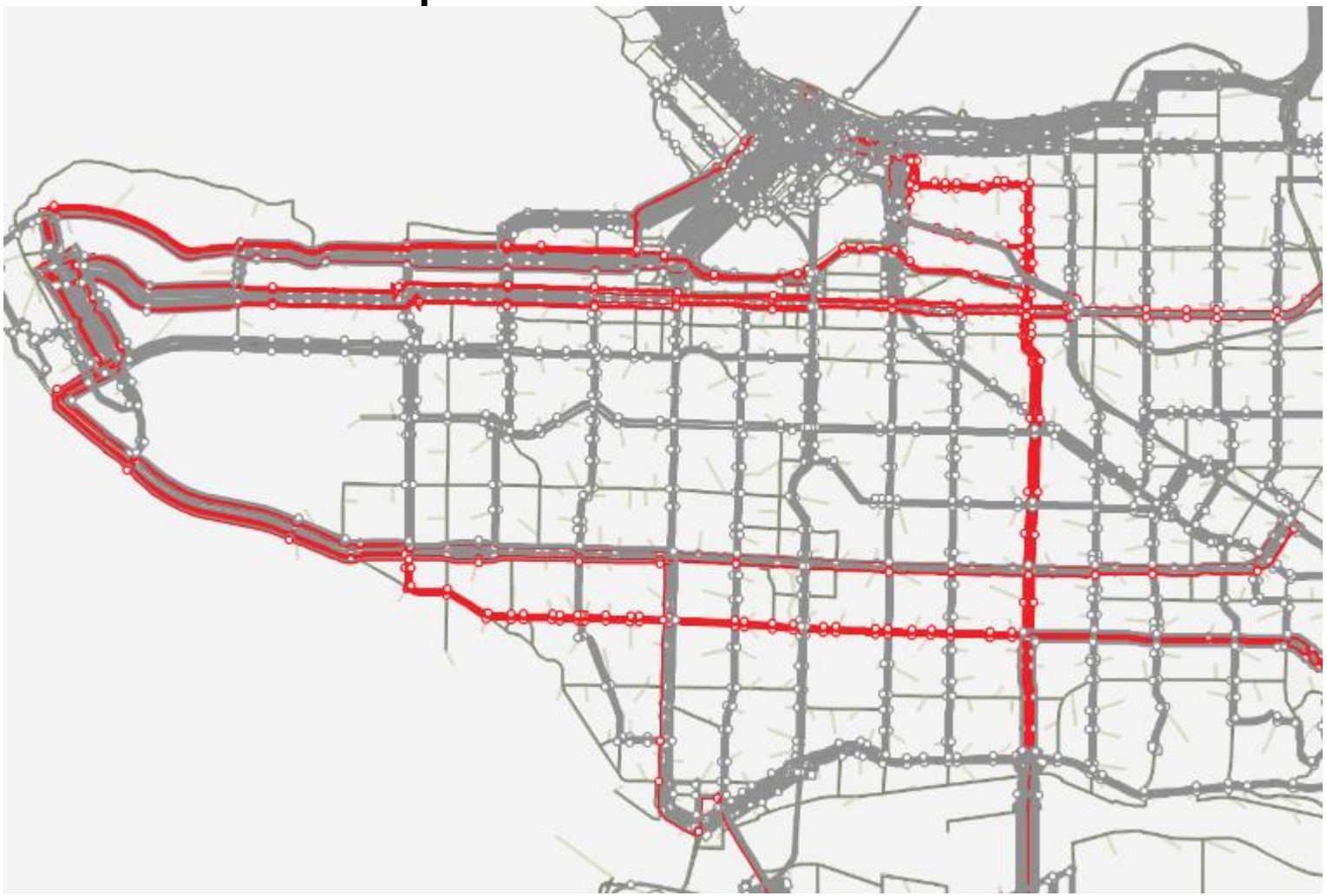


# Network Refinement

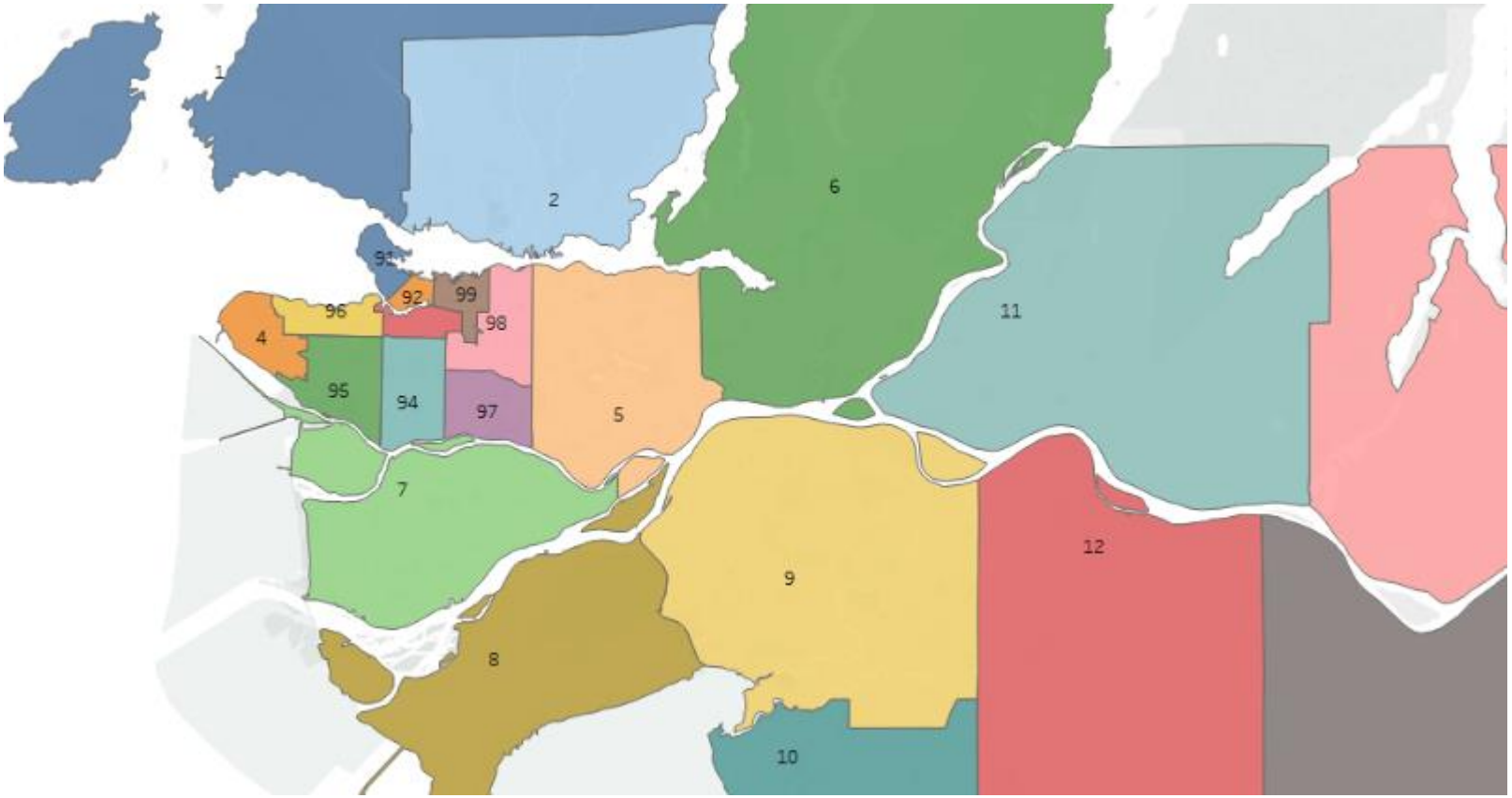
6. **Review and Update Transit Network**
   - Transit Route
   - Line Headway
   - Express Bus Stops

# Network Refinement

## 6. Review and Update Transit Network



# Calibration and Validation



# Calibration and Validation

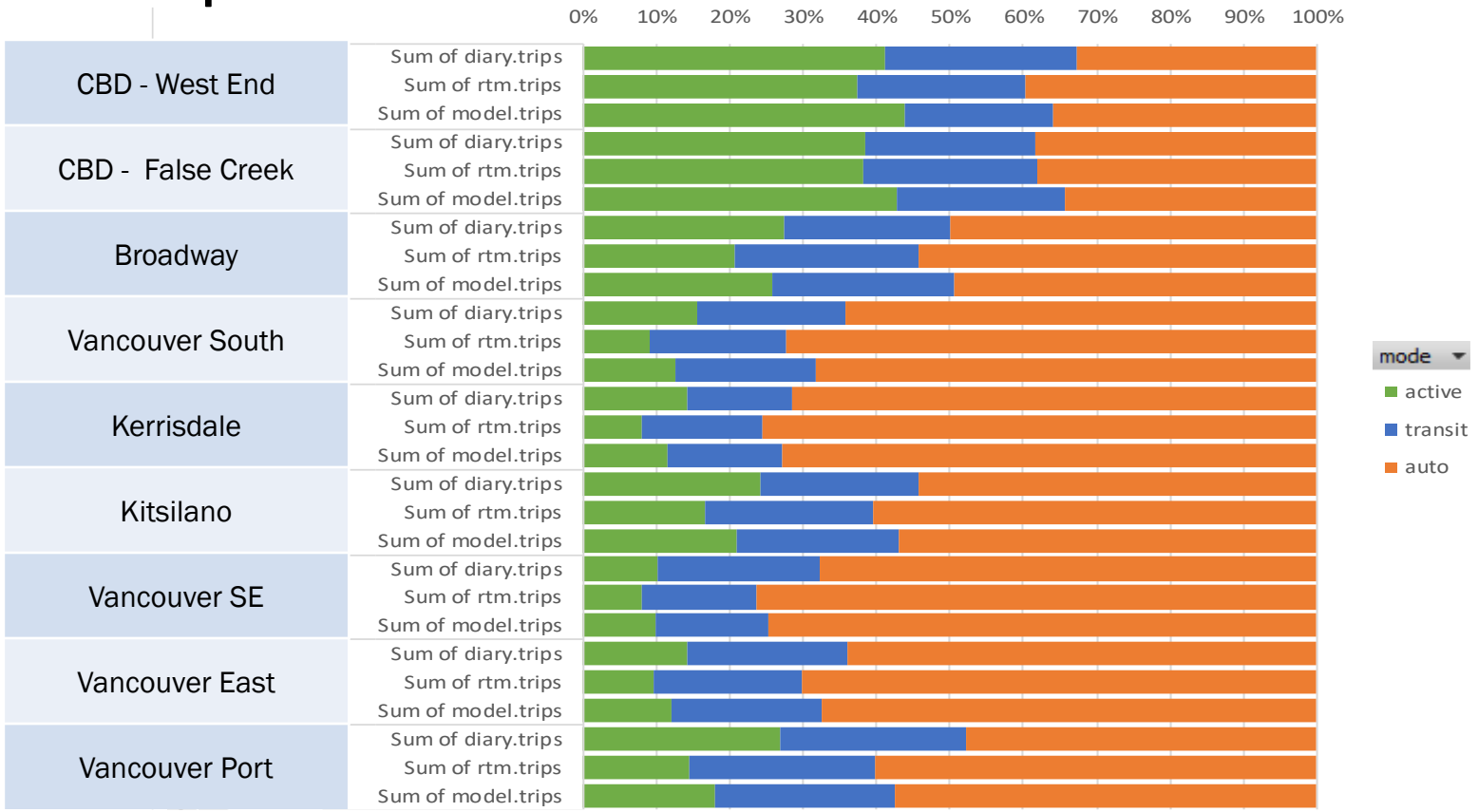
- Active Mode Manhattan Distance ($\Delta x + \Delta y$)


*Figure 4.6: Before and After Using Manhattan Distance*

- Low Vancouver Downtown Transit Ridership
  - Improve Walk-Access to Transit
  - Increase Transit Mode Bias
- UBC-Specific Time Slicing Factors

# Calibration and Validation

- **Mode Splits**




| | | Active | Transit | Auto |
|---|---|---|---|---|
| Vancouver | Trip Diary | 22% | 22% | 56% |
| | RTM | 17% | 21% | 62% |
| | Subarea Model | 21% | 20% | 58% |

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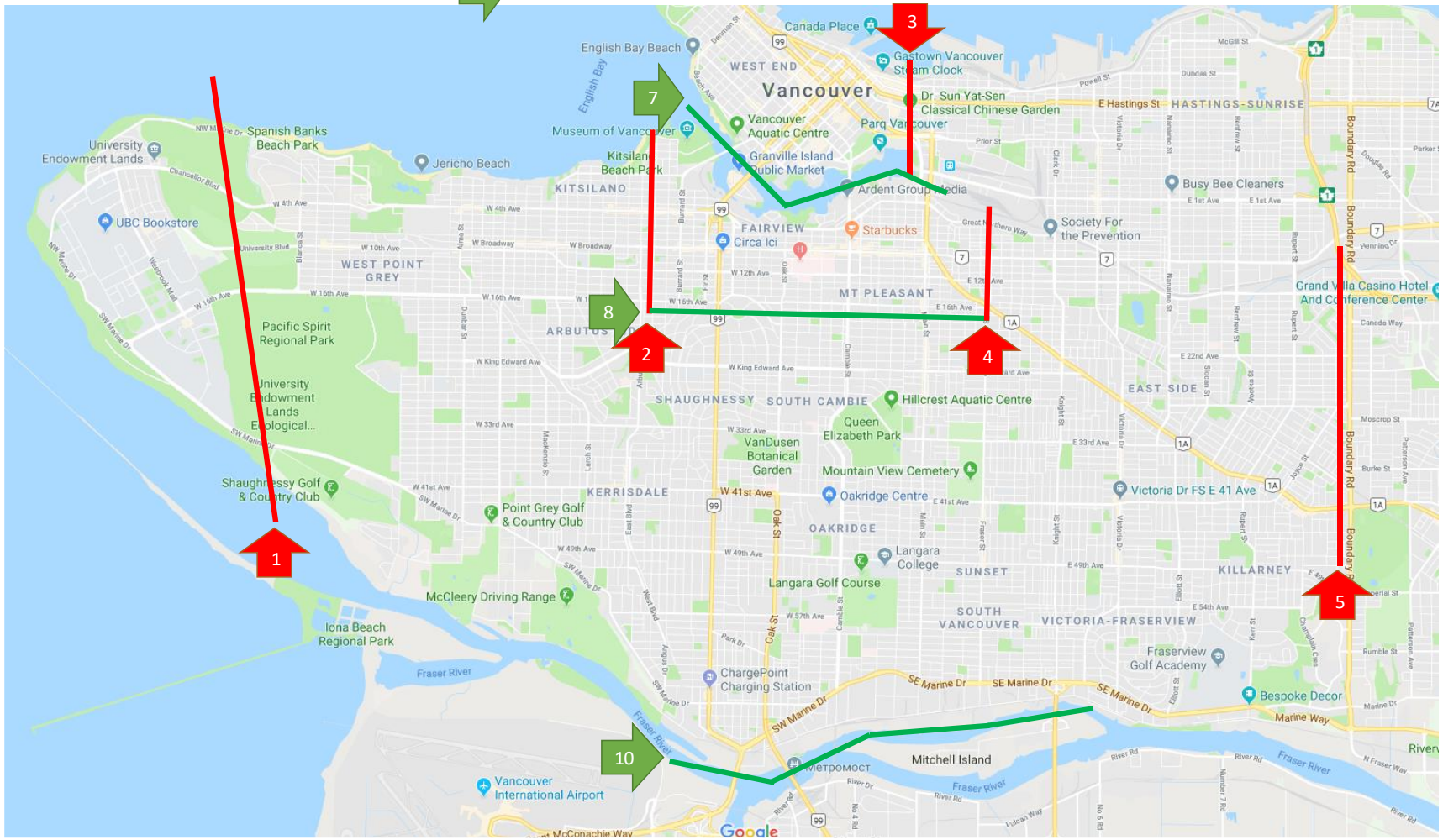
# Calibration and Validation

- Cycling Screenline

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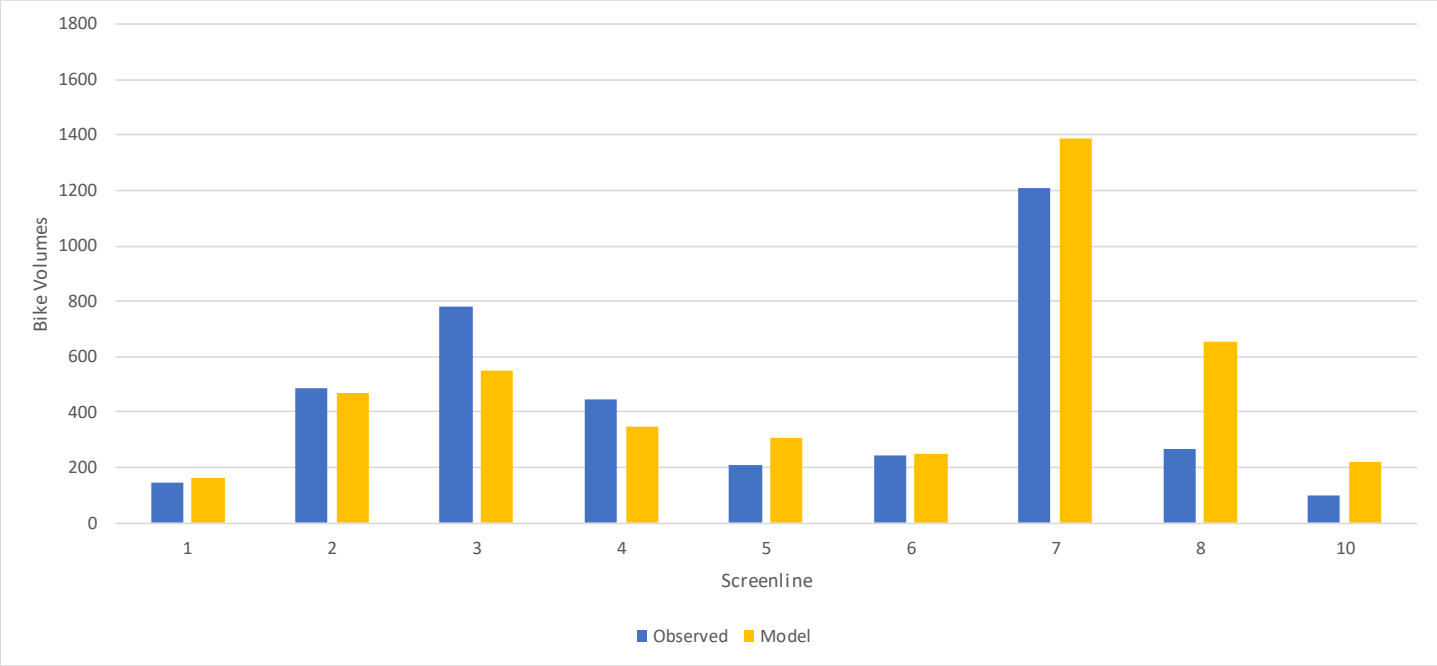
# Calibration and Validation

- Sample Cycling Trips (AM)

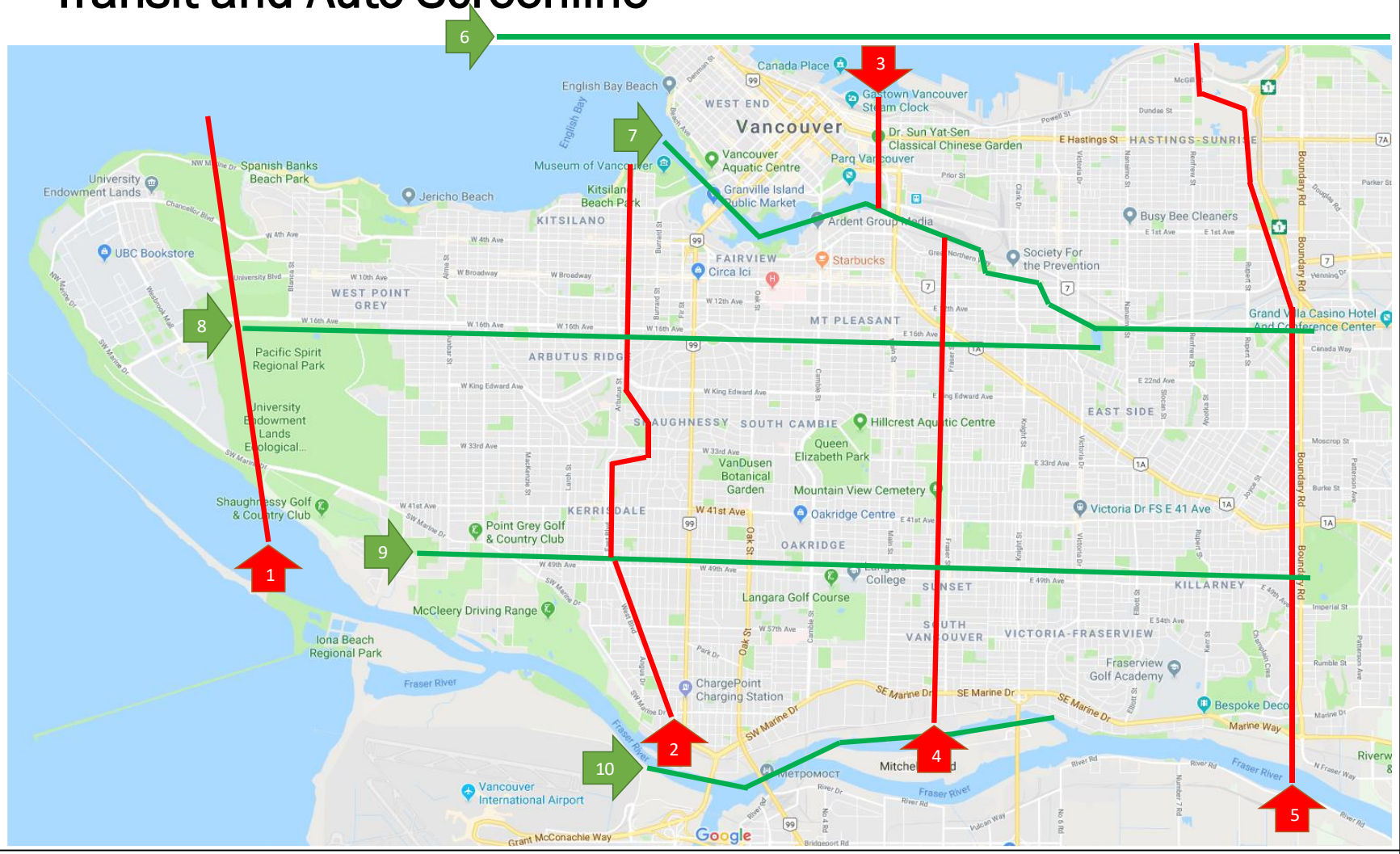


# Calibration and Validation

- Sample Cycling Delaunay Lines (AM)

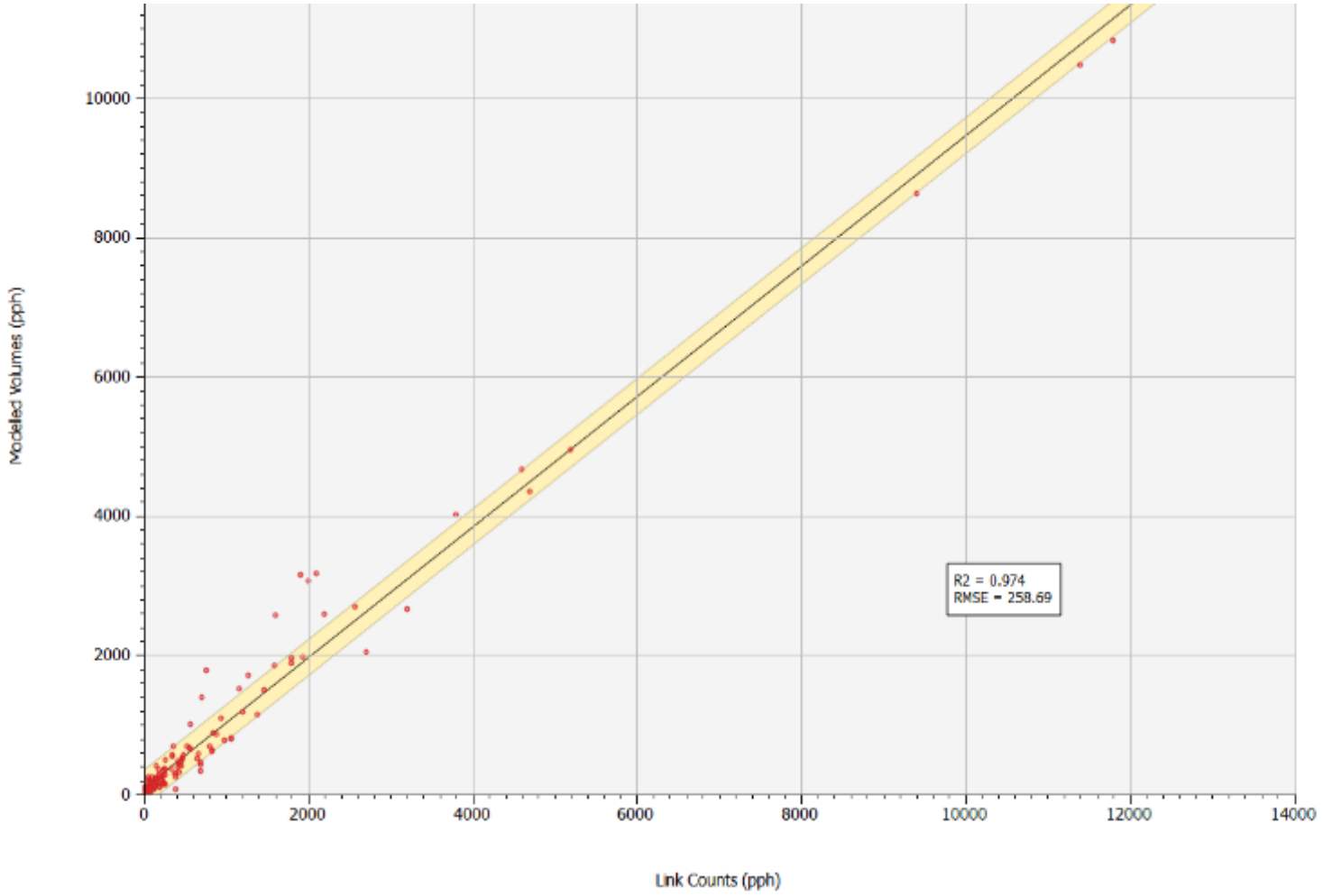
# Calibration and Validation

- Transit and Auto Screenline



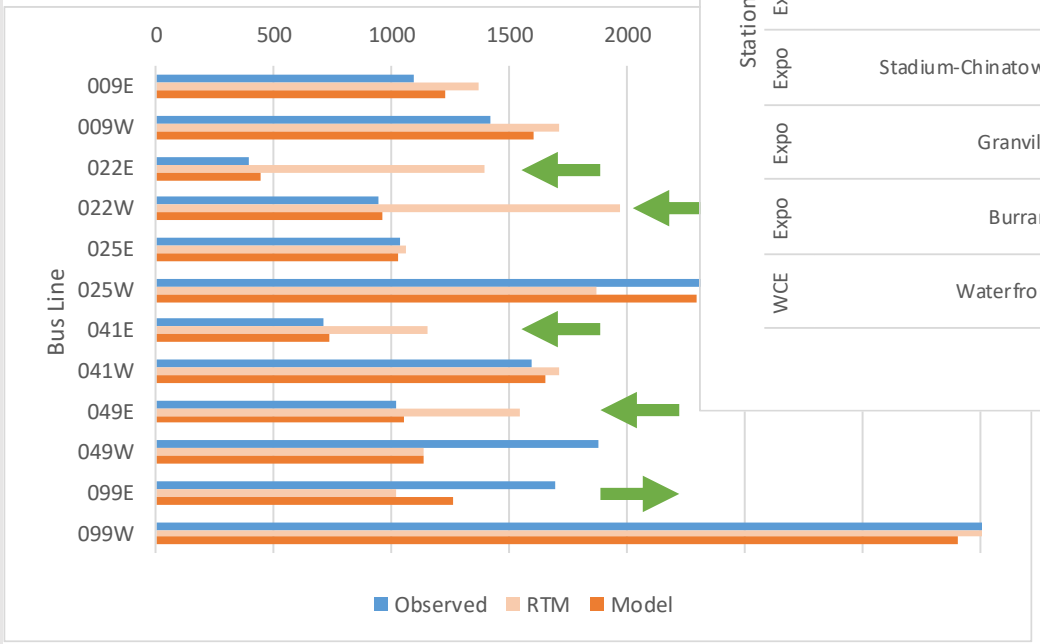
# Calibration and Validation

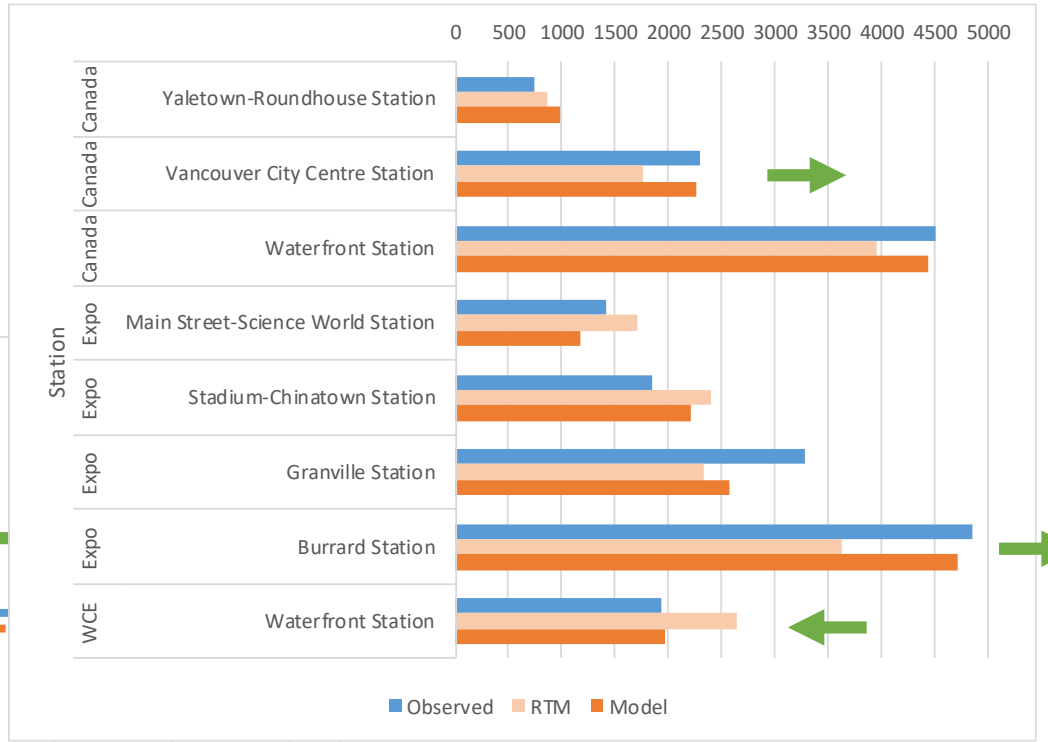
- Transit Ridership Model vs Observed (AM)



# Calibration and Validation

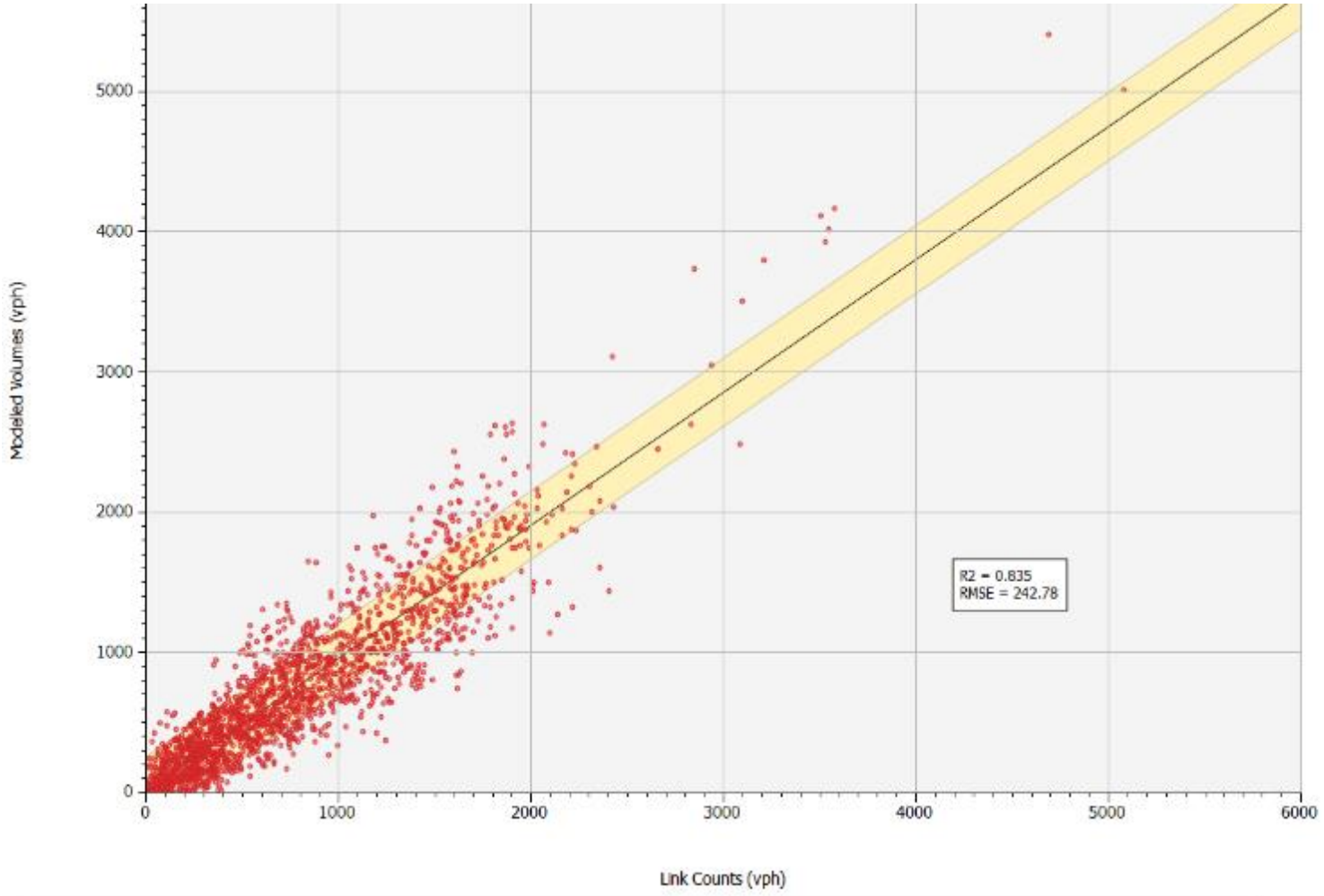
- Sample Transit Ridership (AM)



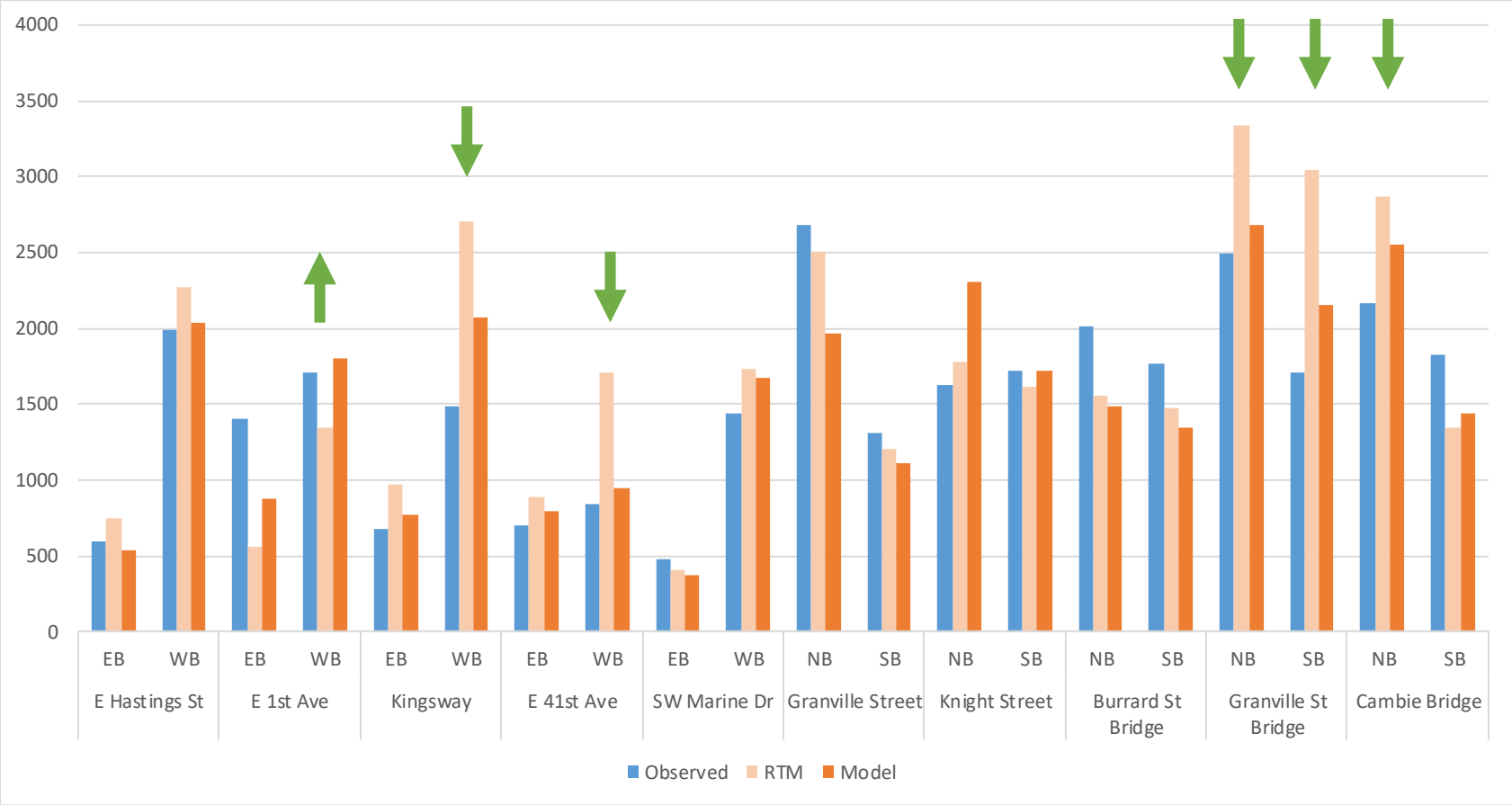
# Calibration and Validation

- Auto Volume Model vs Observed (AM)



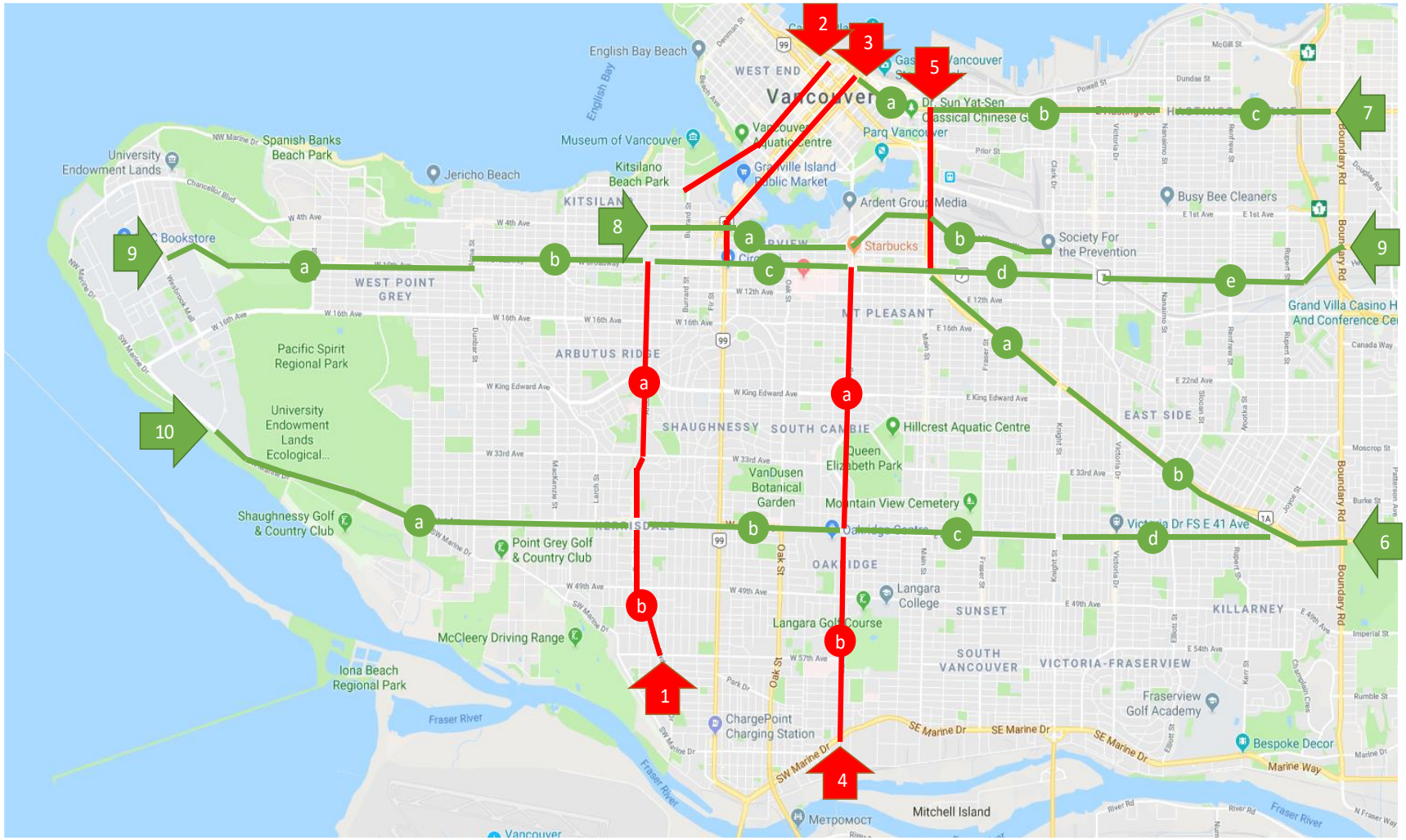
# Calibration and Validation

- Sample Auto Volume (AM)



# Calibration and Validation

- Transit and Auto Travel Time

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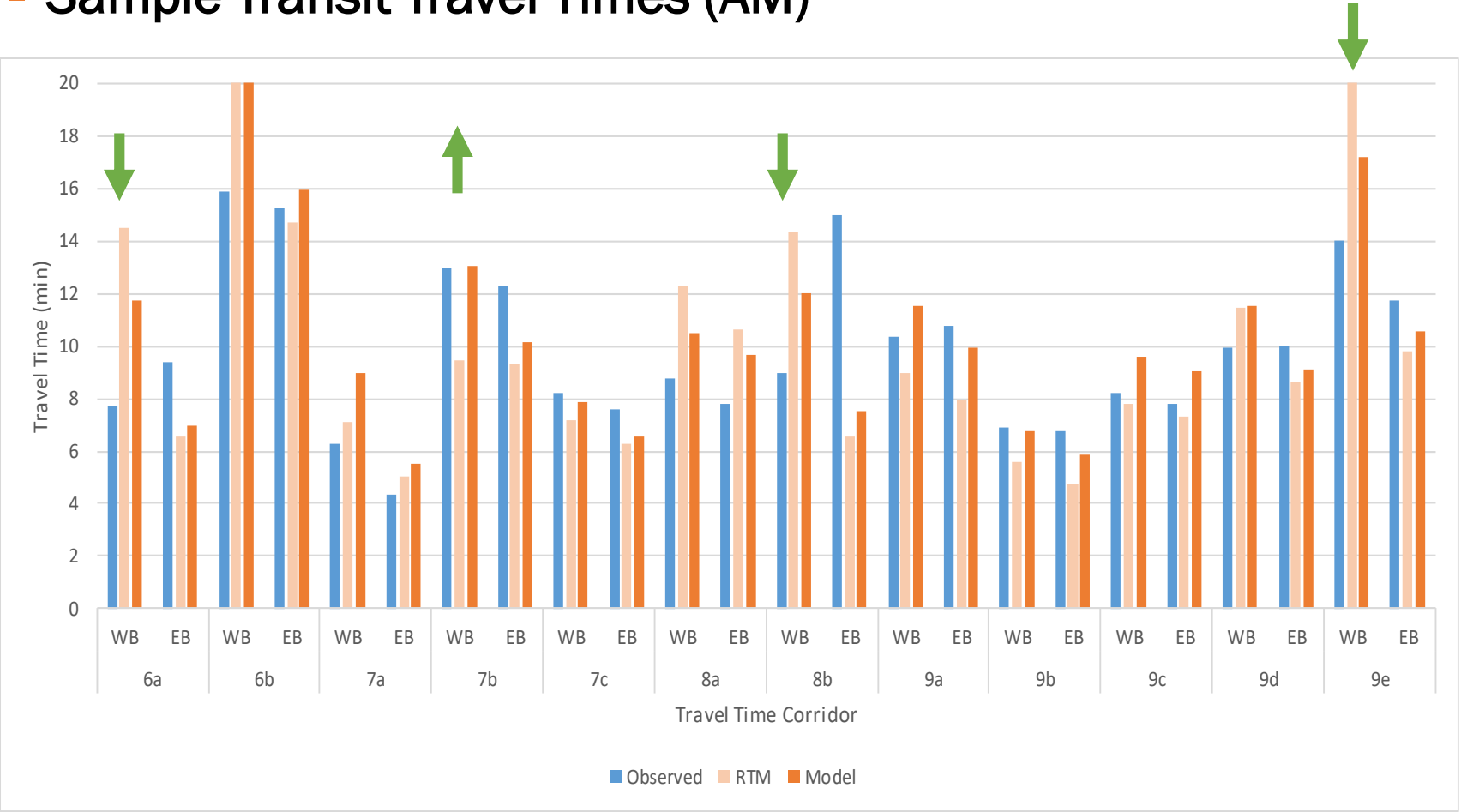
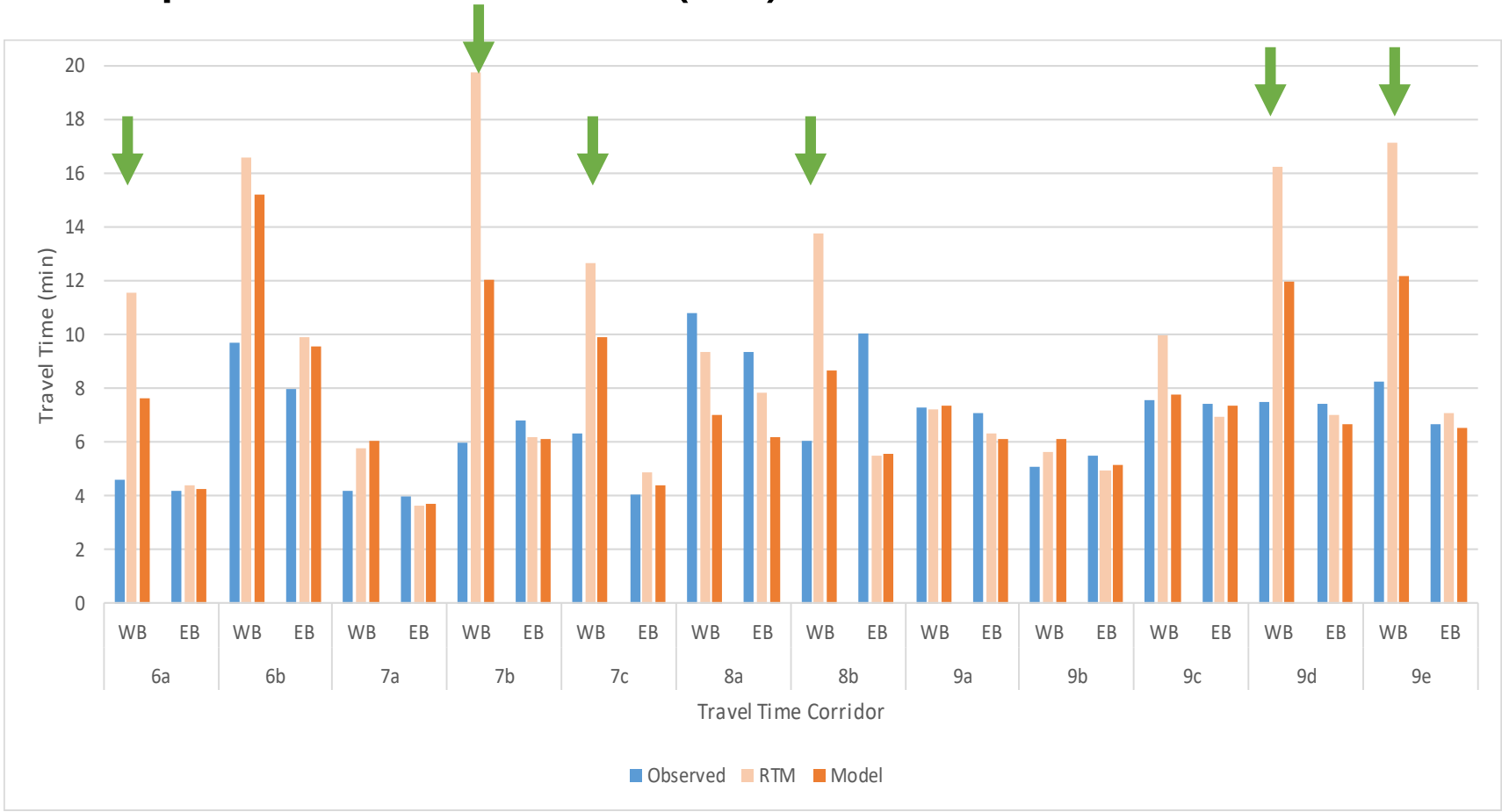
# Calibration and Validation

- Sample Transit Travel Times (AM)



# Calibration and Validation

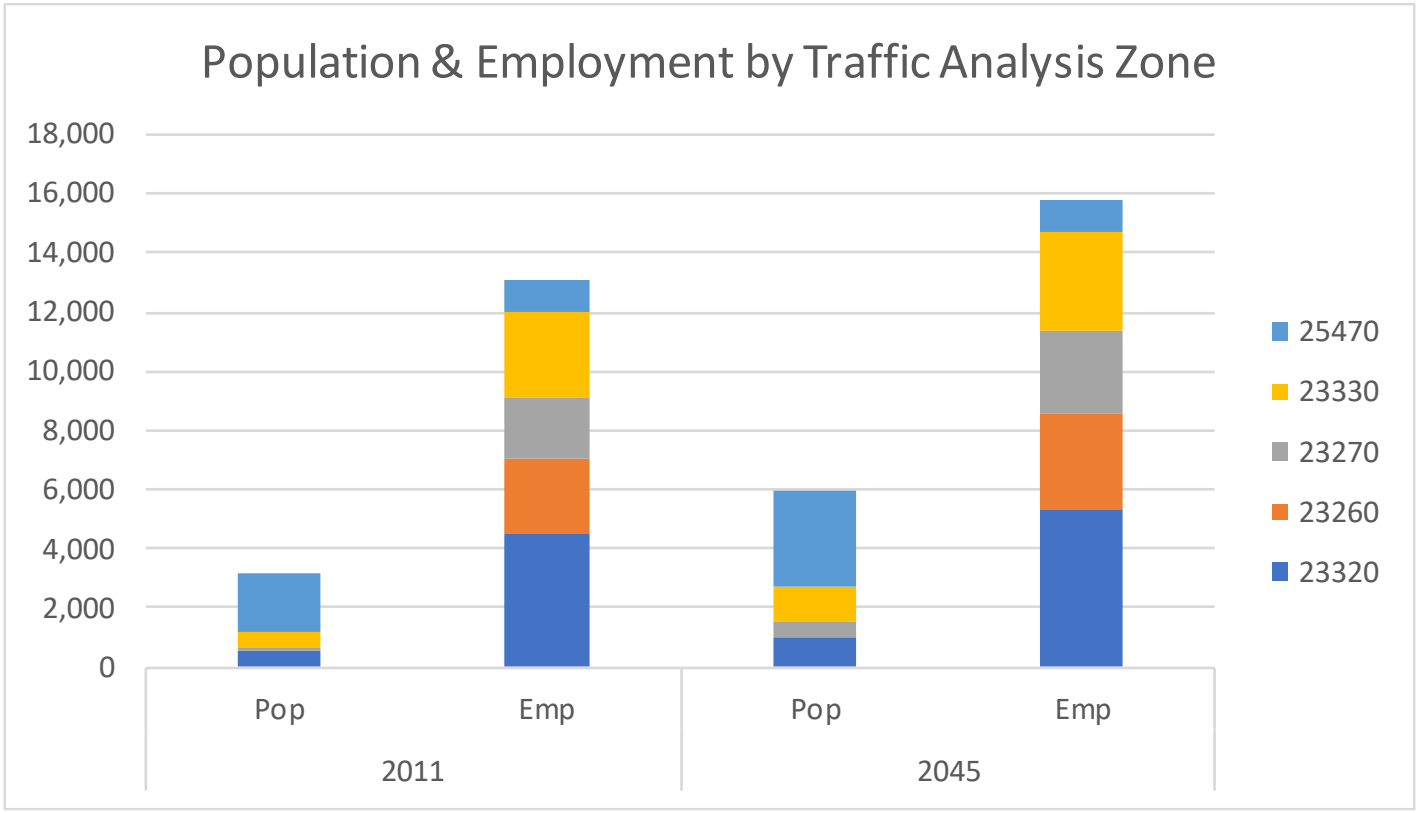
- Sample Auto Travel Times (AM)



# Scenario Testing

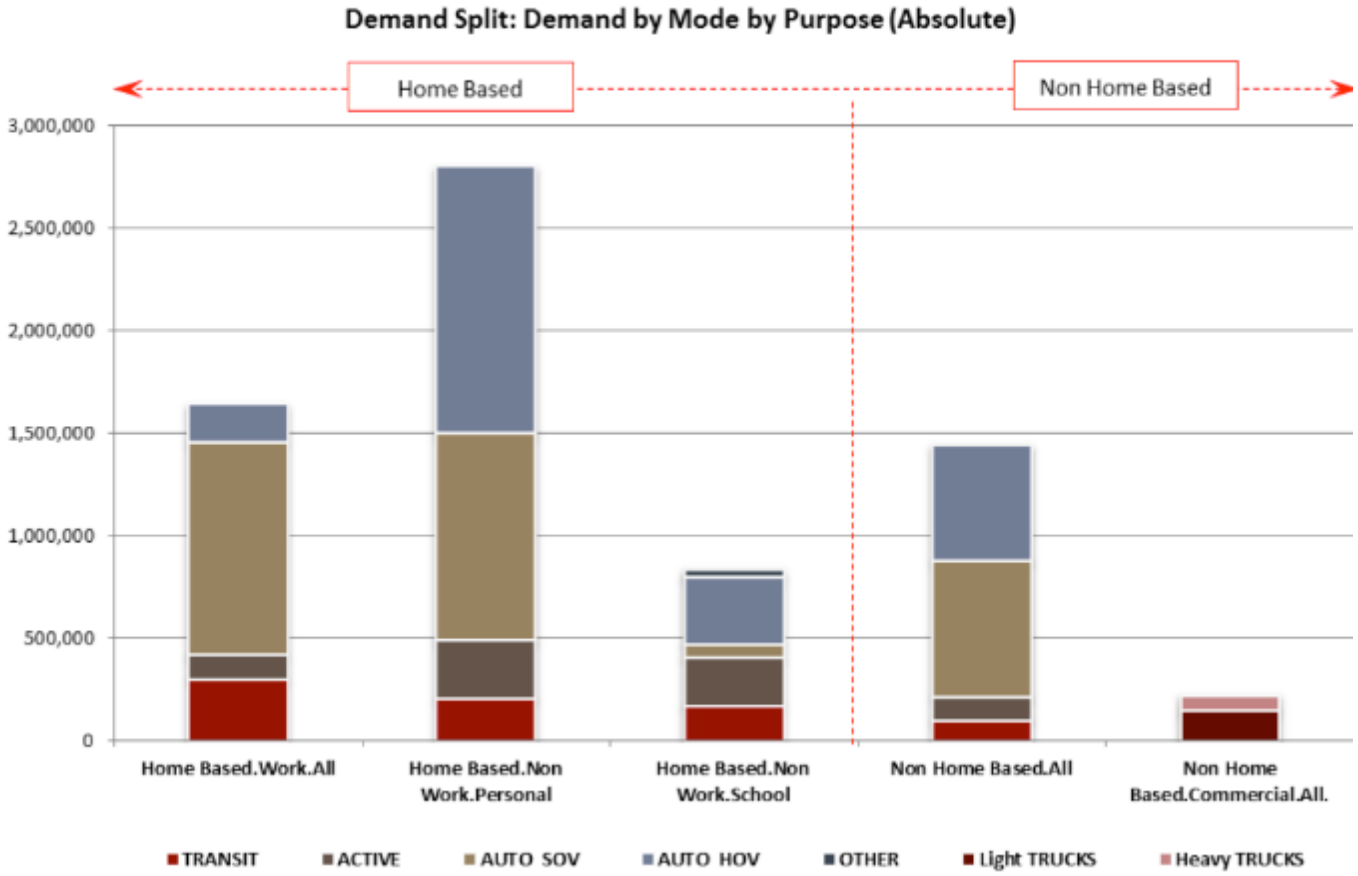
| Type | Long Term | Short Term |
|---|---|---|
| Zone | Redevelopment | |
| Active | New Cycling Infrastructure | |
| Transit | Modify Existing Line | Service Interruption |
| | New Line | Special Event |
| | Fare Changes | |
| | Blanket Changes | |
| Road | Modify Existing Road | Road Work Closure |
| | New Road | Special Event |
| | Parking Rates | |
| | Toll / Road Pricing | |
| | Blanket Changes | |

# Results Example – Population & Employment

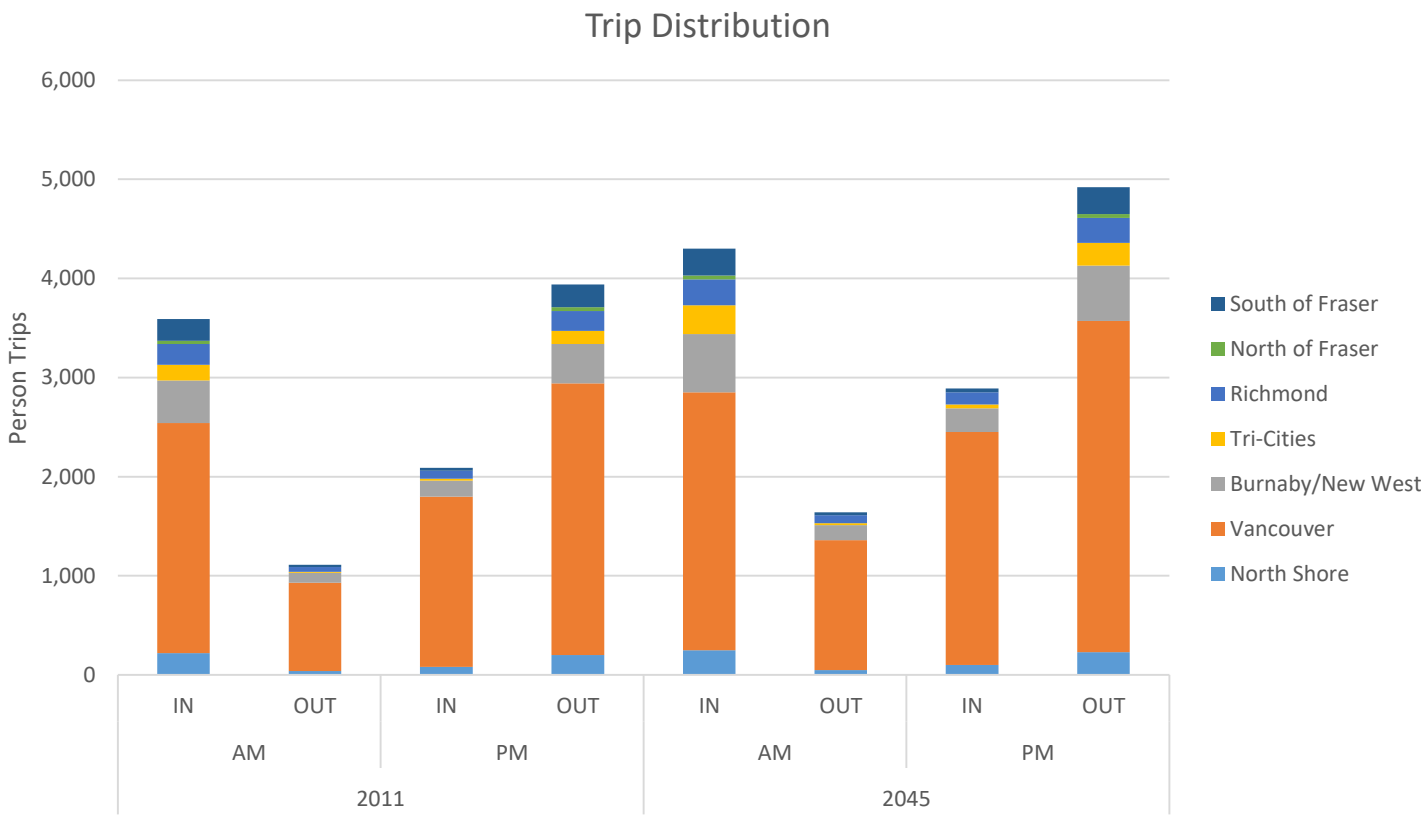


# Results Example – Daily Mode by Purpose

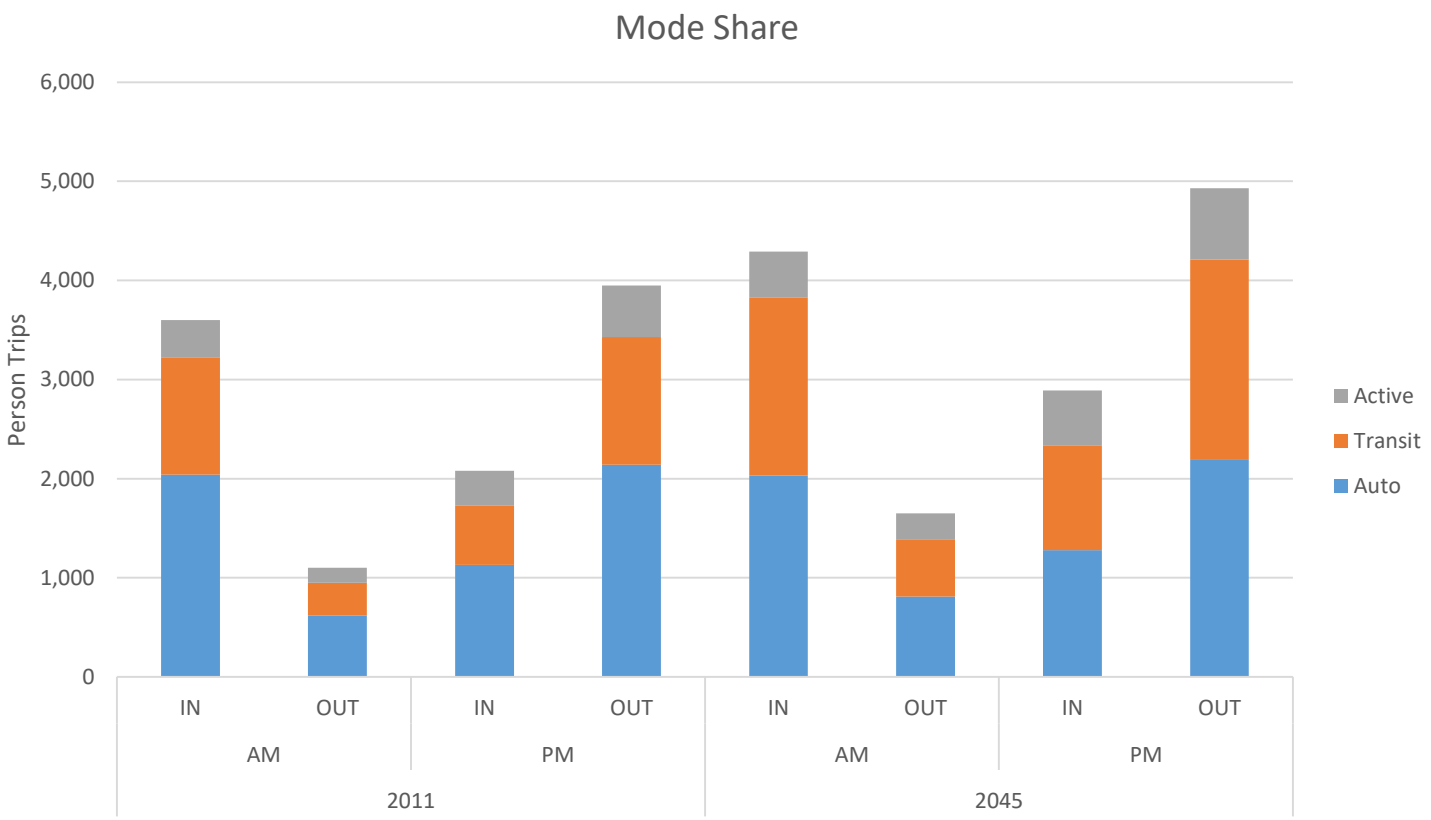
## 24hr Demand: Mode by Purpose



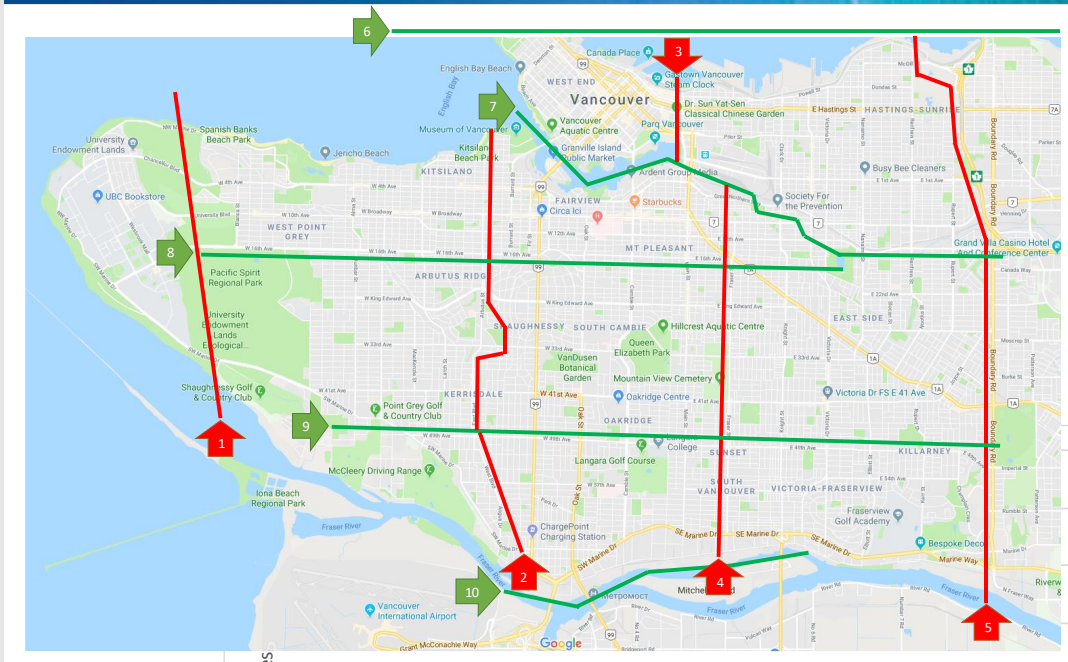
# Results Example – Peak Hour Distribution

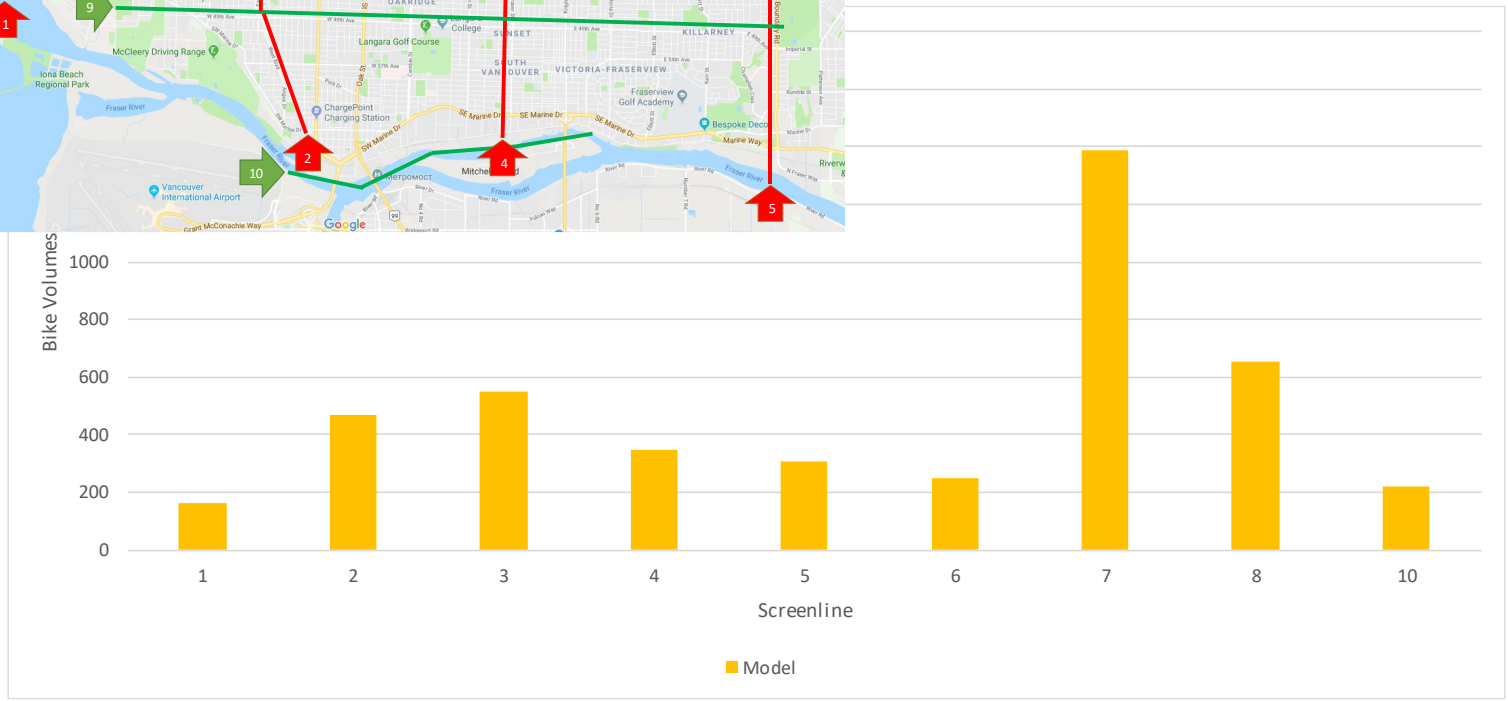


# Results Example – Peak Hour Mode Share

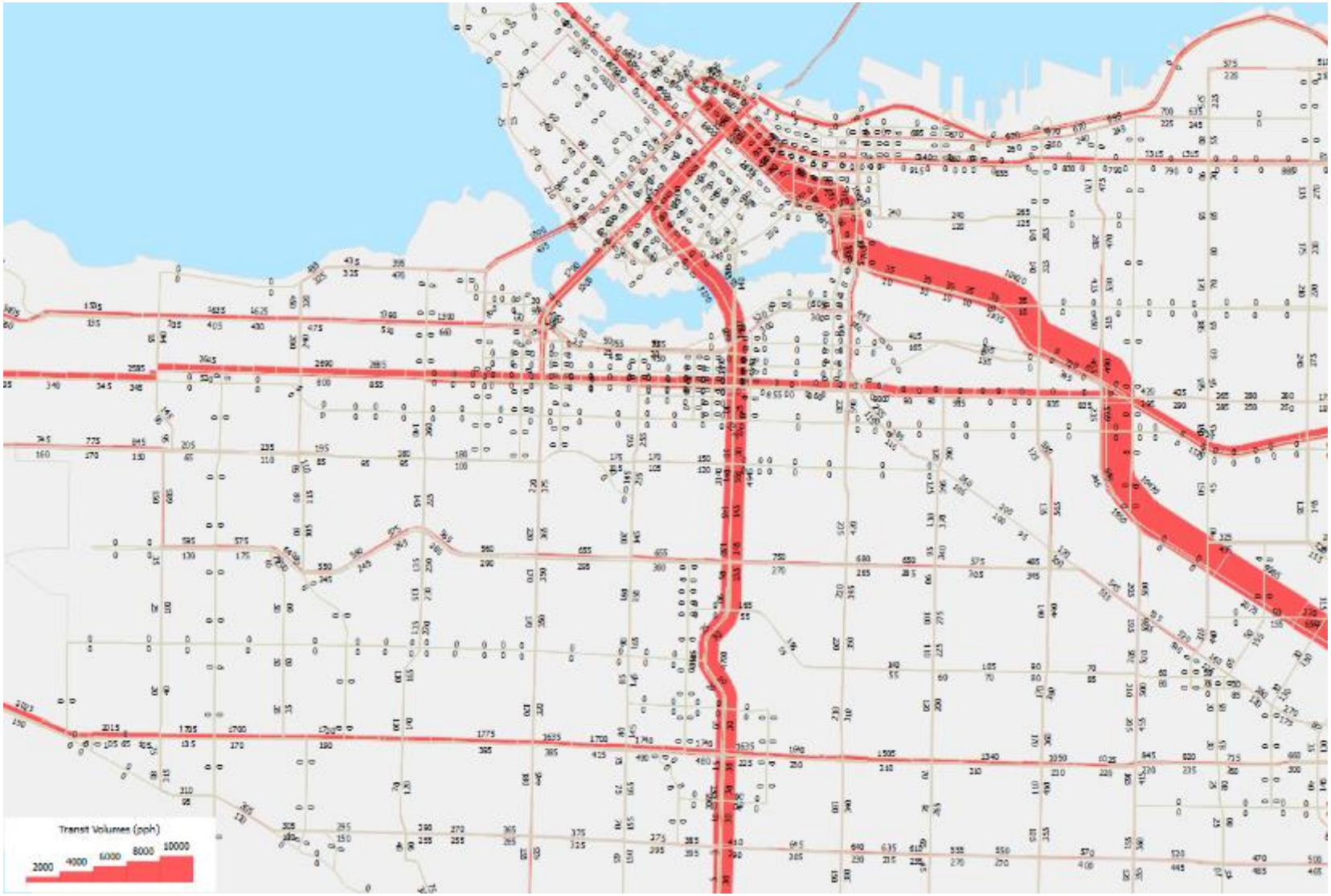


# Results Example – Peak Hour Cycling Volumes

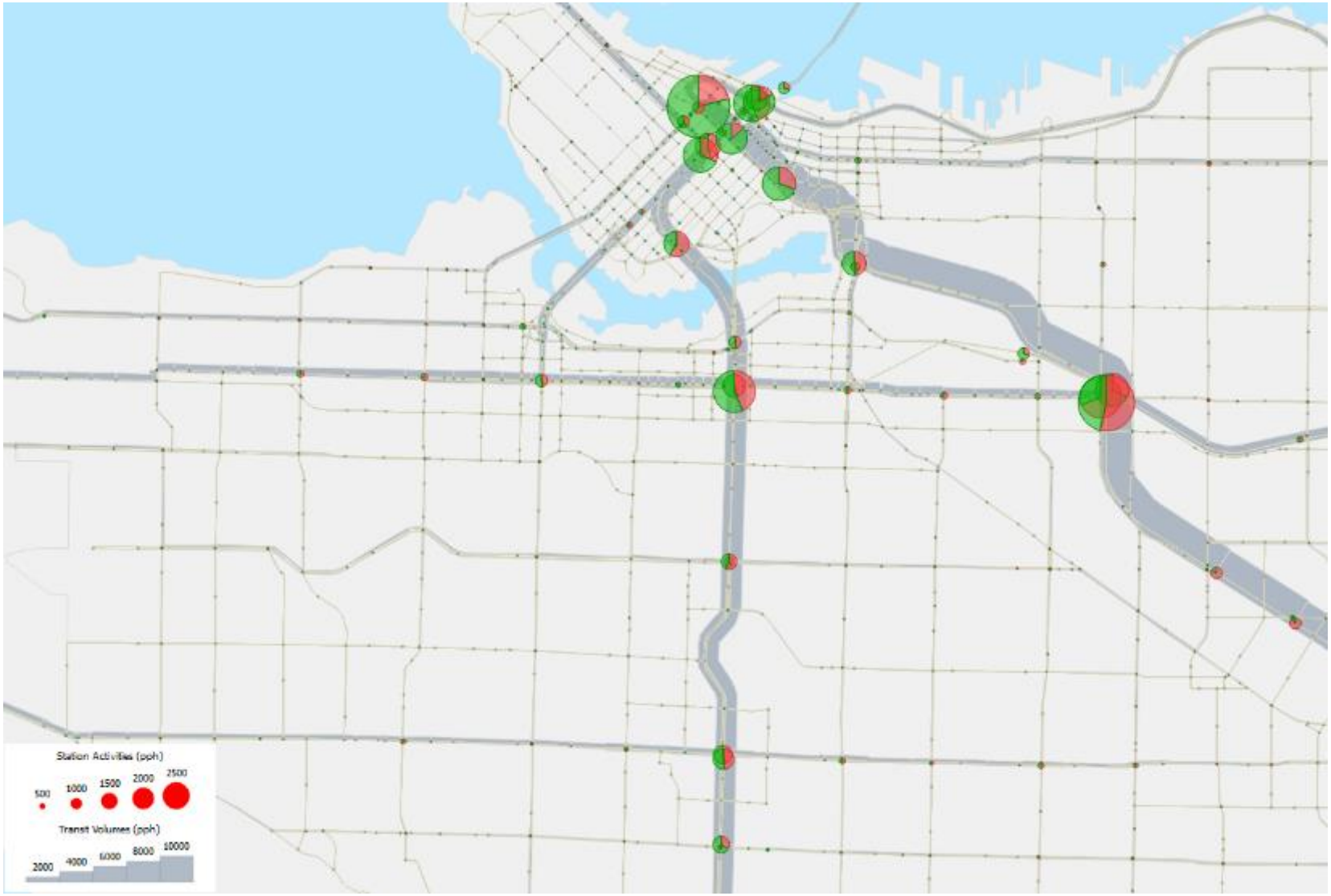


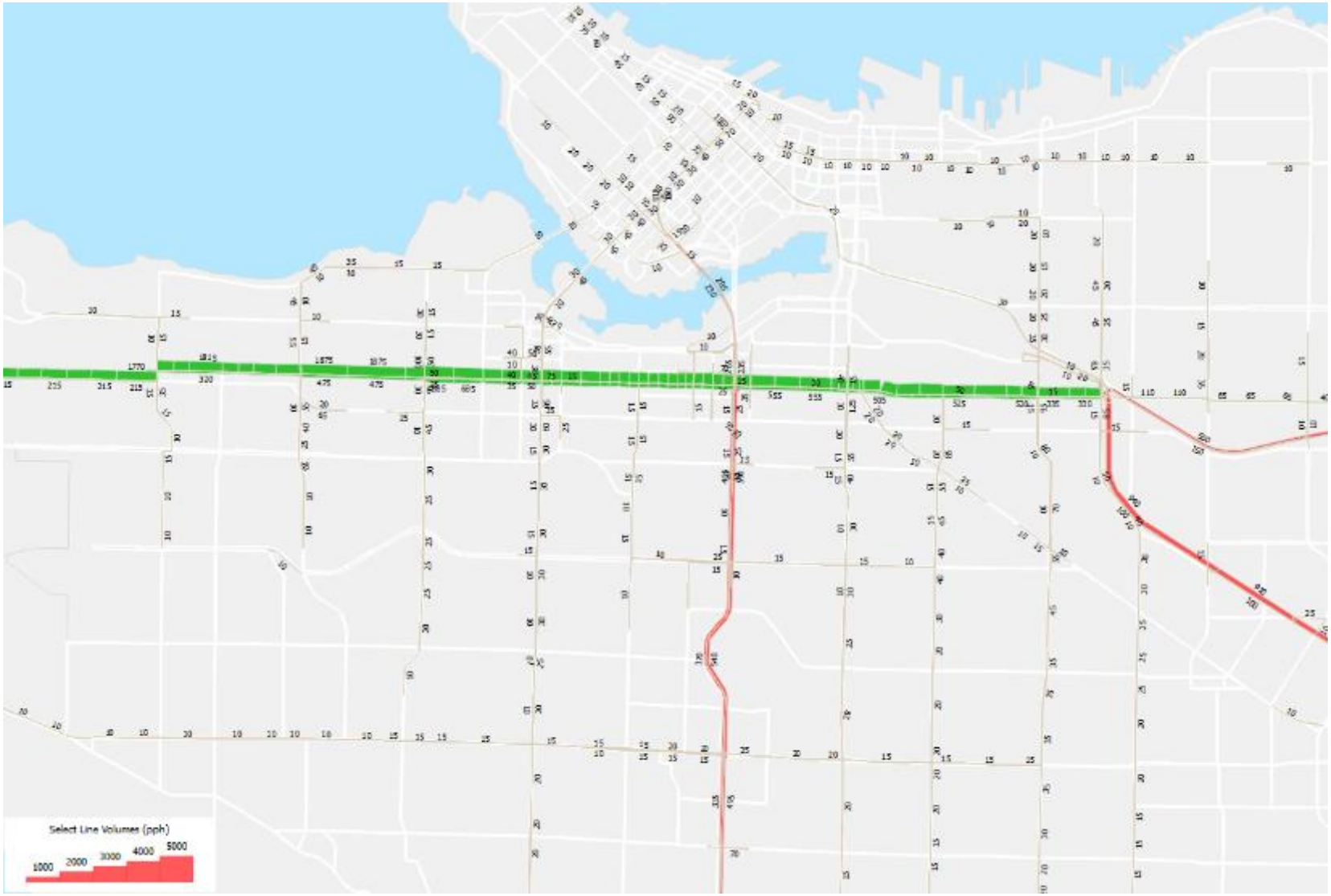
# Results Example – Peak Hour Transit Volumes



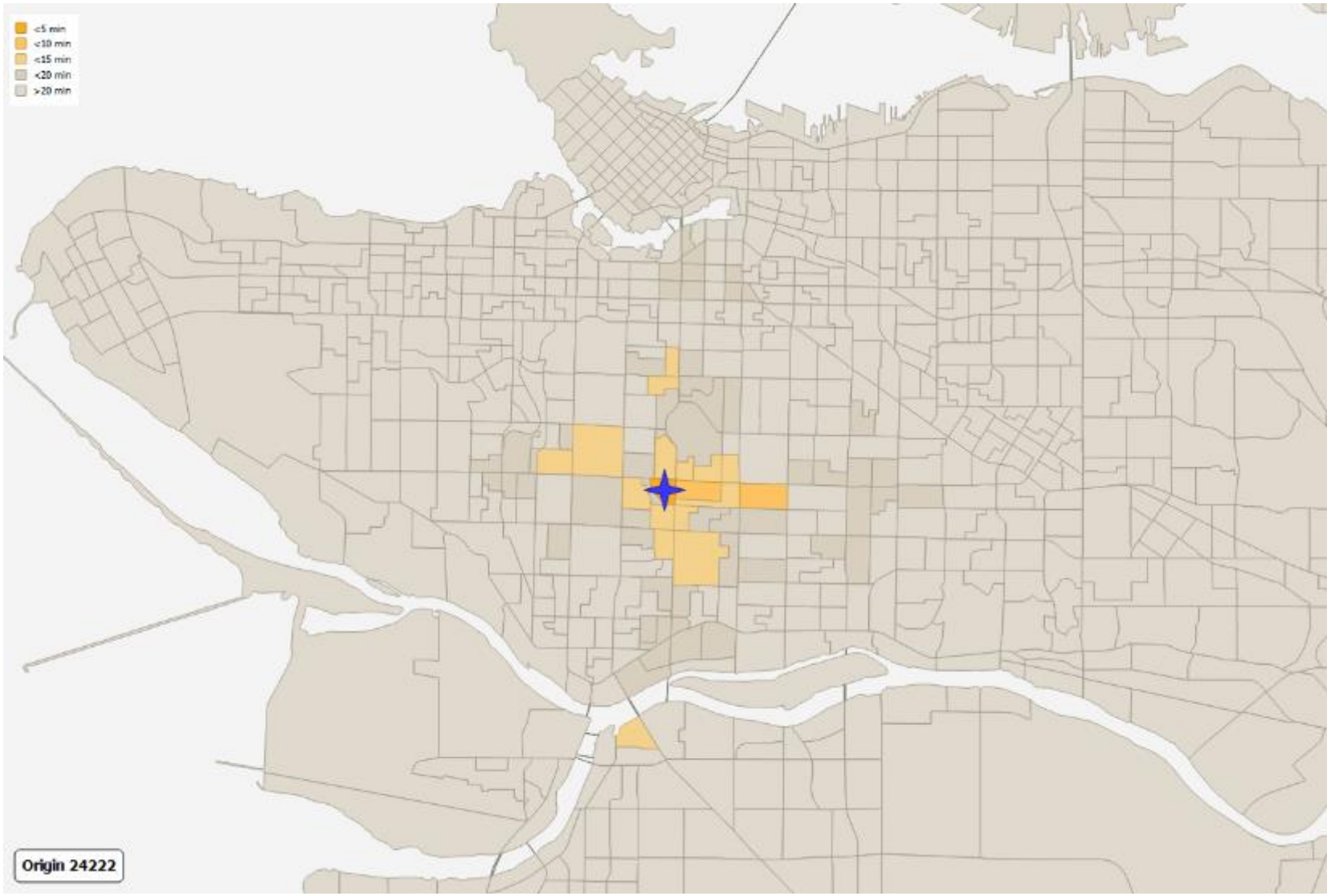
# Results Example – Peak Hour Station Activities



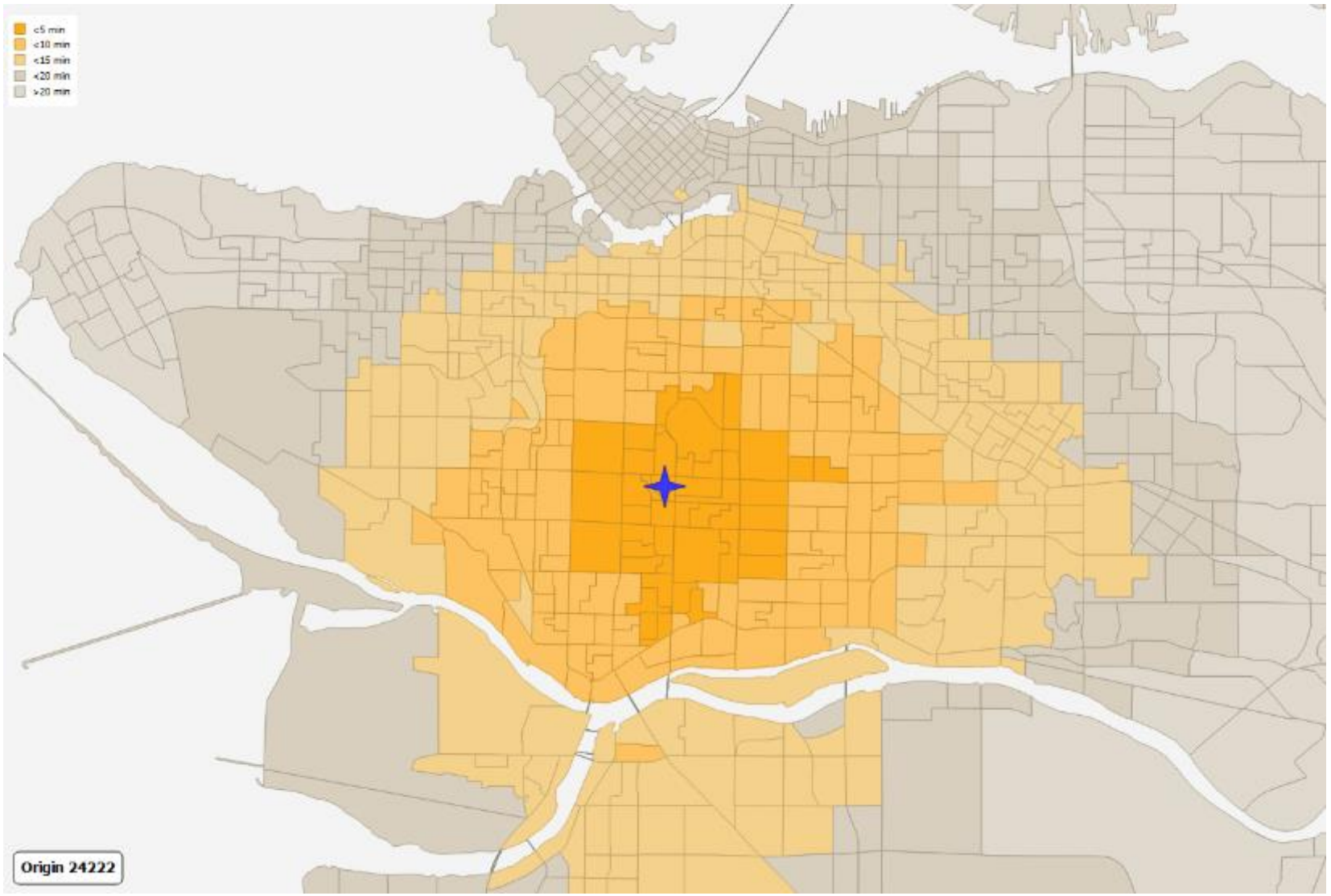
# Results Example – Peak Hour Select Line Transit Volumes



# Results Example – Peak Hour Transit Travel Time



# Results Example – Peak Hour Auto Travel Time



# Next Steps

## Phase 2

- Option Testing
  - Transit ridership scenarios and option packages
  - Input for Transport 2050

## Phase 3

- TBD

# THANK YOU

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