McElhanney

Travel Time Validation

RTM Stakeholders Meeting

October 28th, 2019

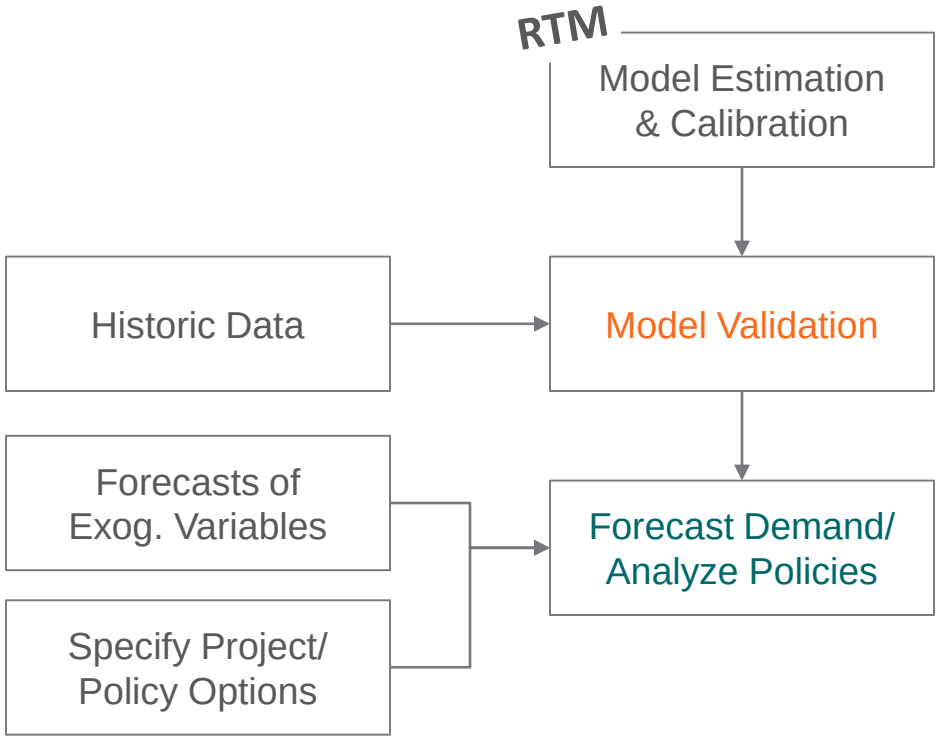
CANADA'S BEST MANAGED COMPANIES

Outline

- Why do we need travel time validation?
- Sample Project: Surrey-Langley SkyTrain Ridership Forecast
- Lessons learned

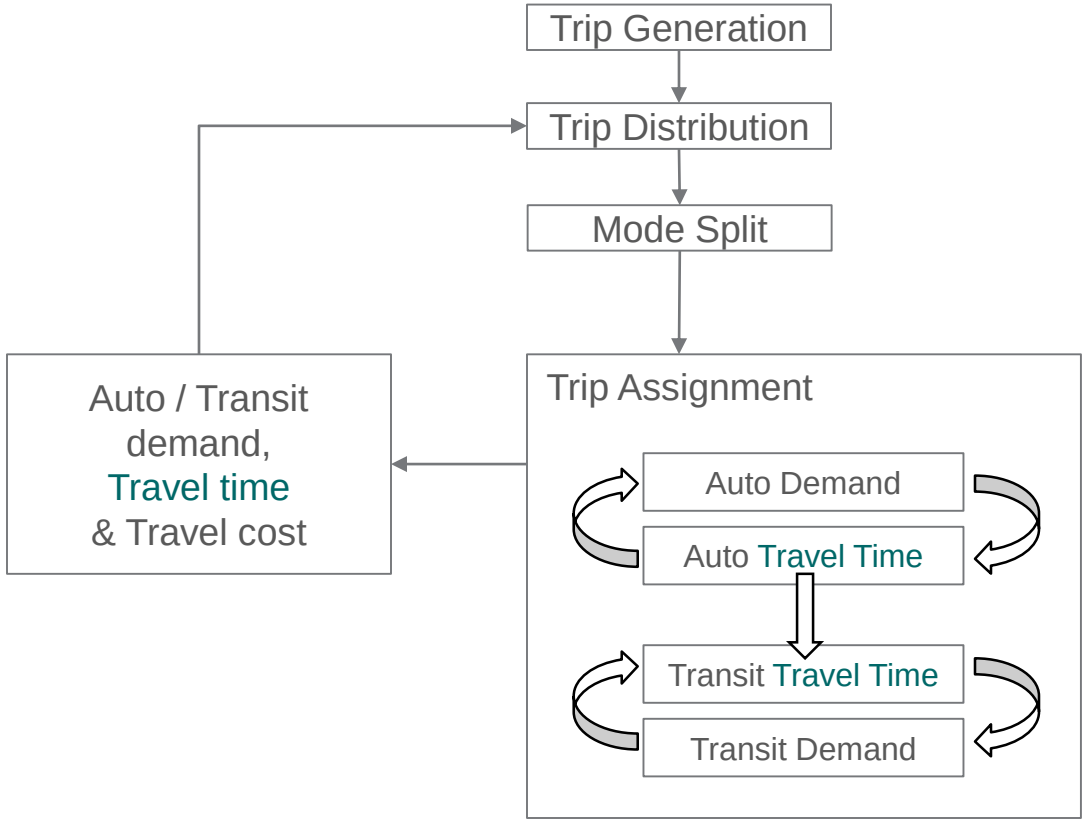
Why
do we need travel time validation?

The Demand Analysis Process



- Evaluate how well the model replicates the existing condition.
- Understand the limitations of the model as a forecasting tool.

The Four Stage Model

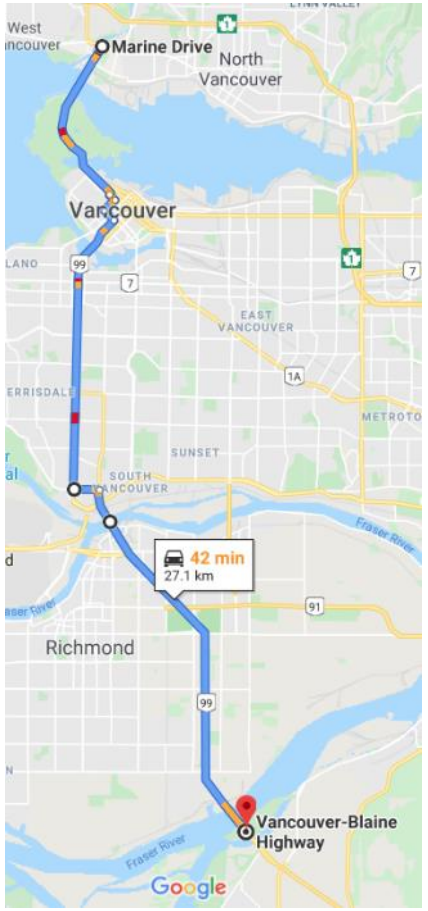


- Model Validation:
  1. Auto travel time
  2. Auto travel distance (operating cost)
  3. Auto demand
  4. Transit travel time
  5. Transit demand
  6. Mode share

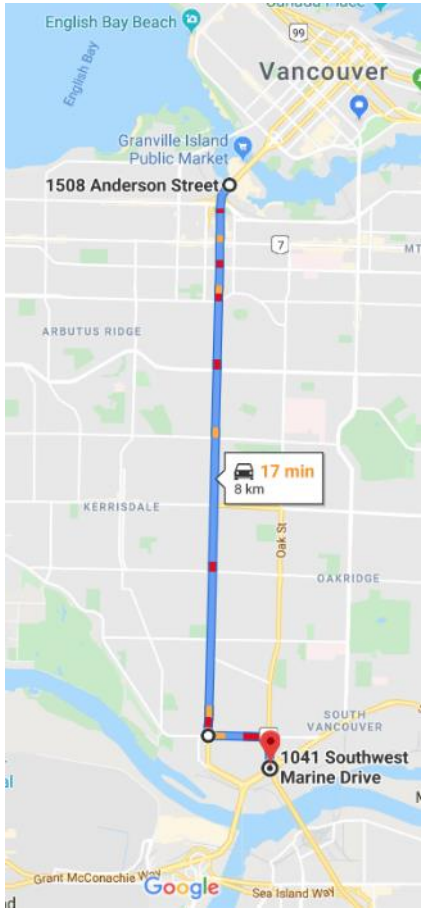
Travel Time Validation

- Compares modelled travel time to observed travel time
- Modelled:
  - link attribute ‘timau’ in RTM
- Observed:
  - Google Maps API
  - Passive Data (INRIX / TomTom / StreetLight)
  - Bluetooth (Mac Address)
  - GPS Survey (Floating Car Survey)

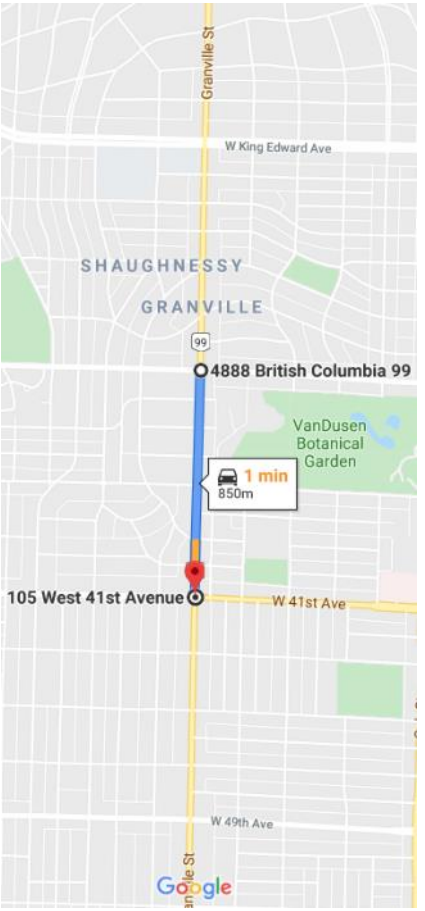
Regional Travel Time



Corridor Travel Time



Segment Travel Time



Travel Time Validation as the FIRST step

- The travel time data is easily accessible.
- Travel time validation is an effective way of reviewing the network assumptions.
- Well-validated model gives modeller confidence in the forecast.

The Risk

- Traffic & Revenue Study
- Business Case
- Ridership Forecast

Travel Time Validation Example

Surrey-Langley SkyTrain Ridership Forecast Project

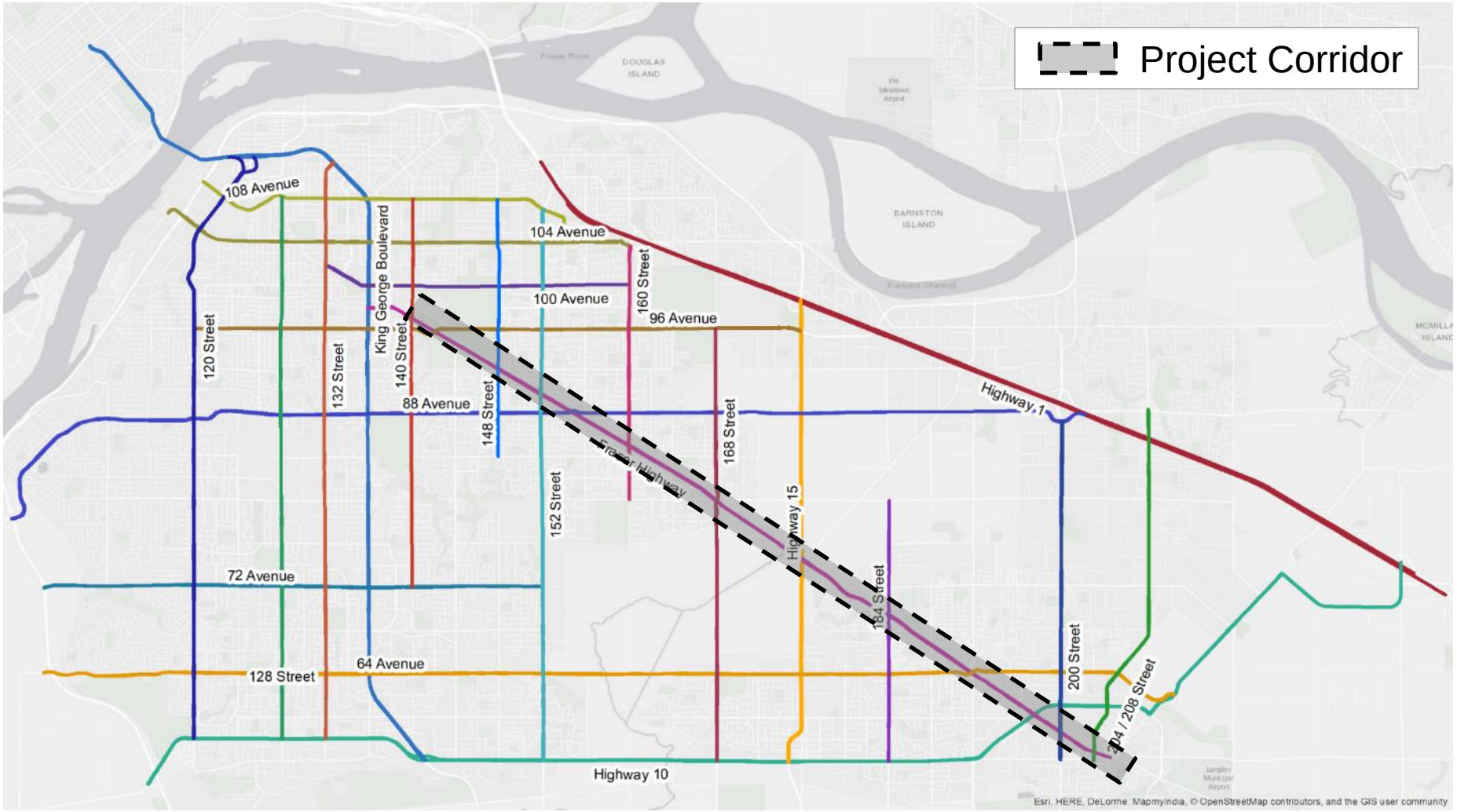
Surrey-Langley SkyTrain Project - Objectives

- Forecast ridership
- Estimate project benefits
- Support the business case

1. Travel Time Validation Corridors

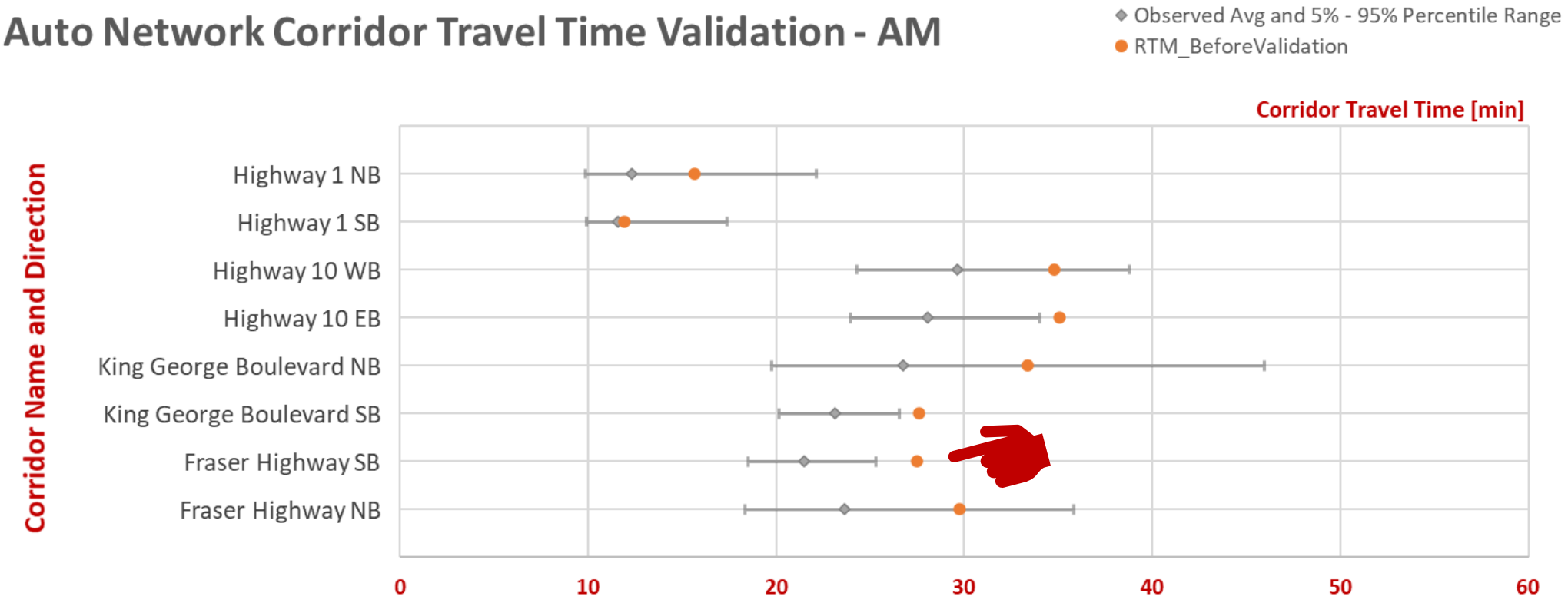
Identified regional corridors

**DRA Road Classification of Major Collectors and Above*

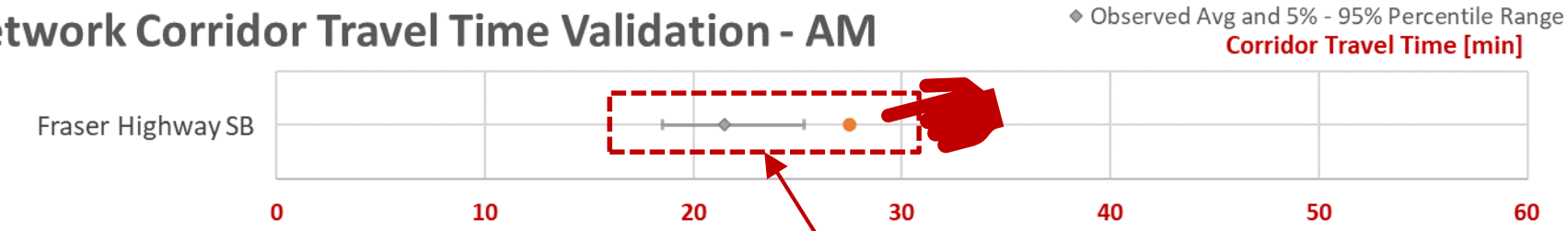


2. High-level Review of Corridor Travel Time

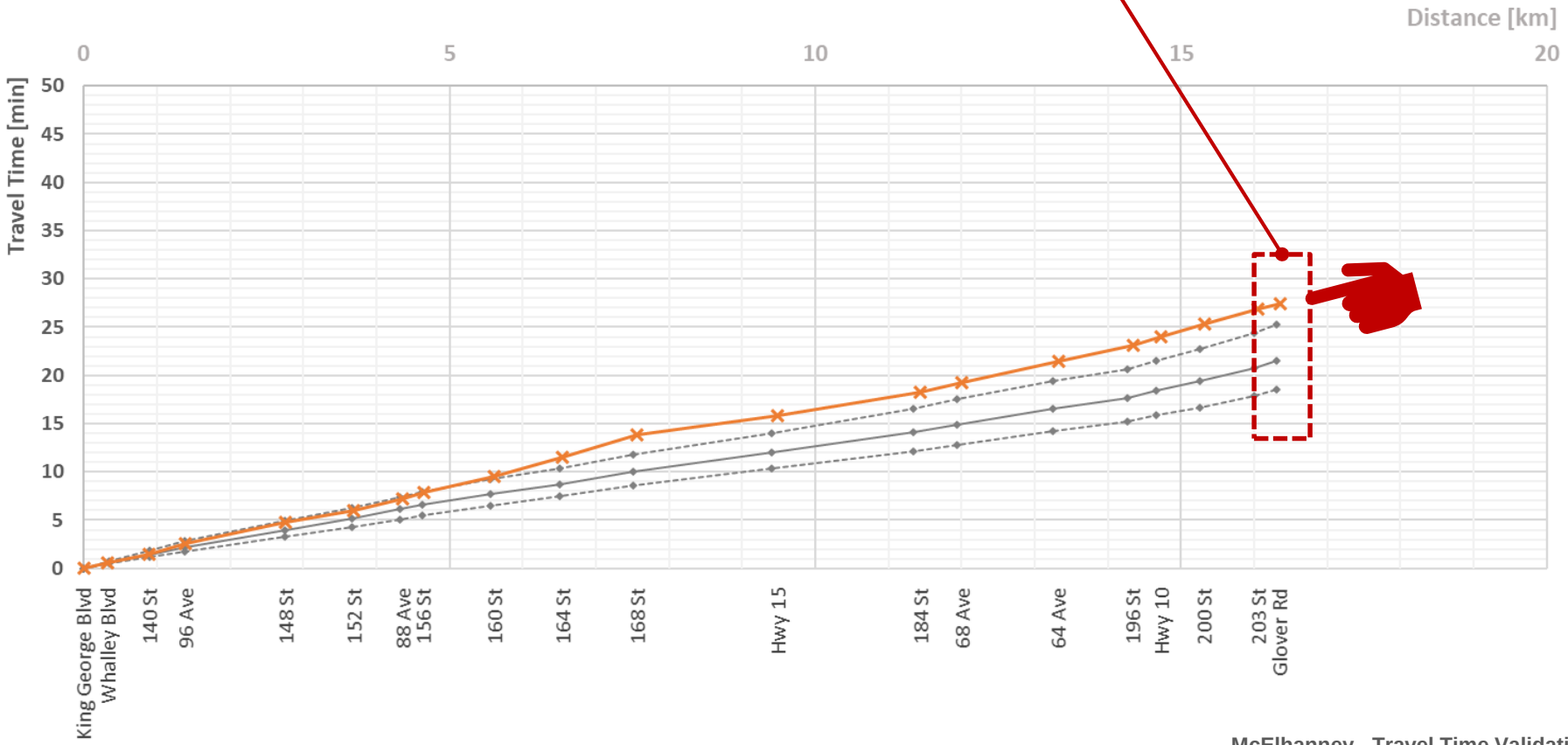
Validated the corridor end-to-end travel time



Auto Network Corridor Travel Time Validation - AM



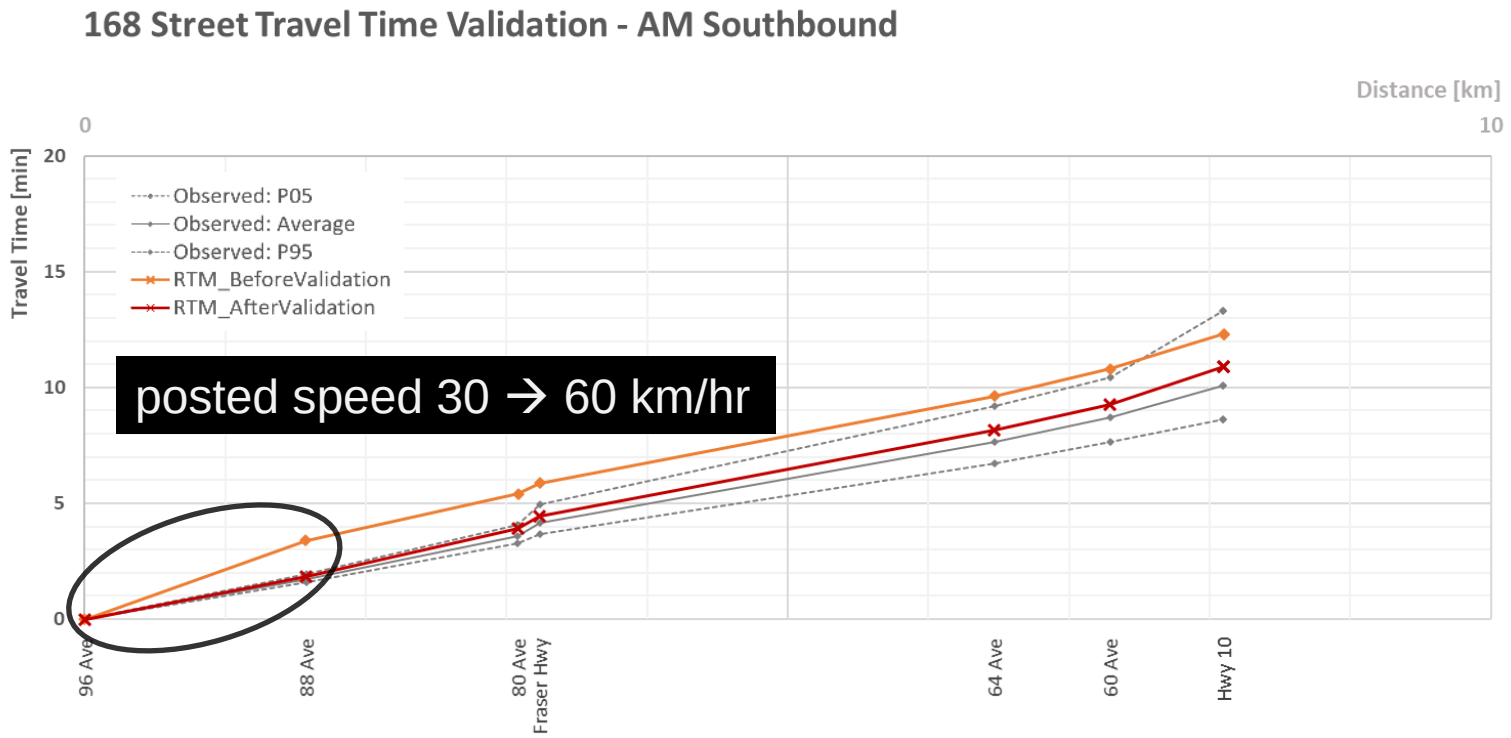
Fraser Highway Travel Time Validation - AM Southbound



3. Review the Corridor Time-Space Diagrams

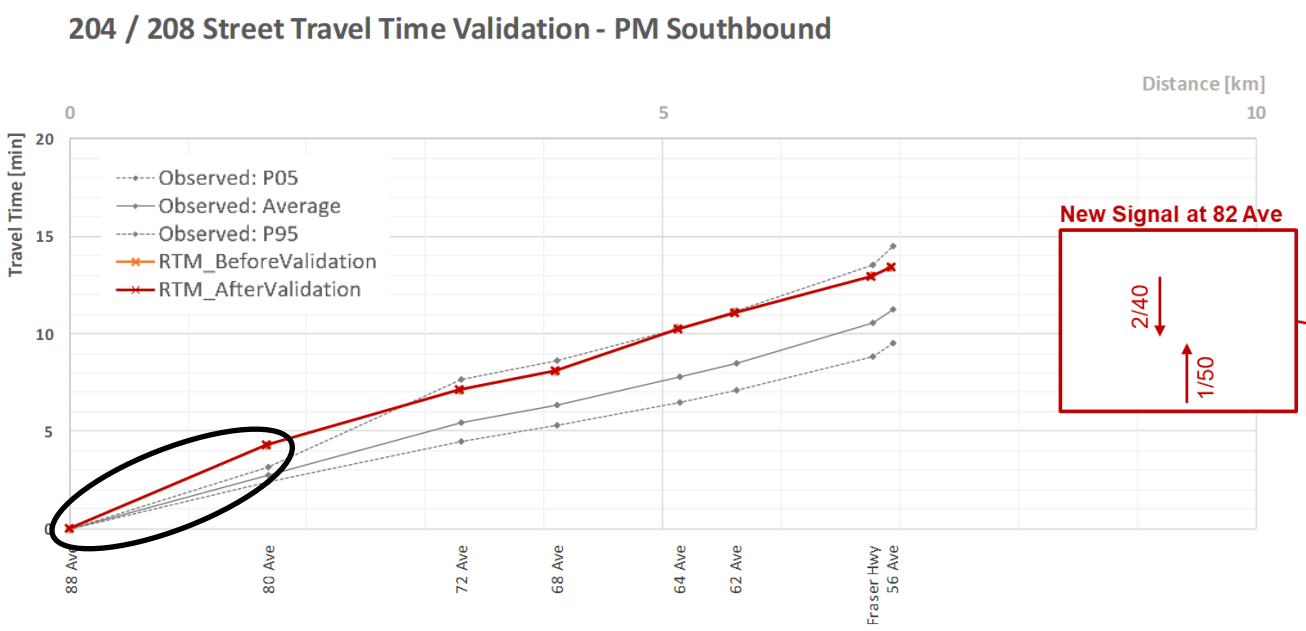
Plotted corridor time-space diagrams

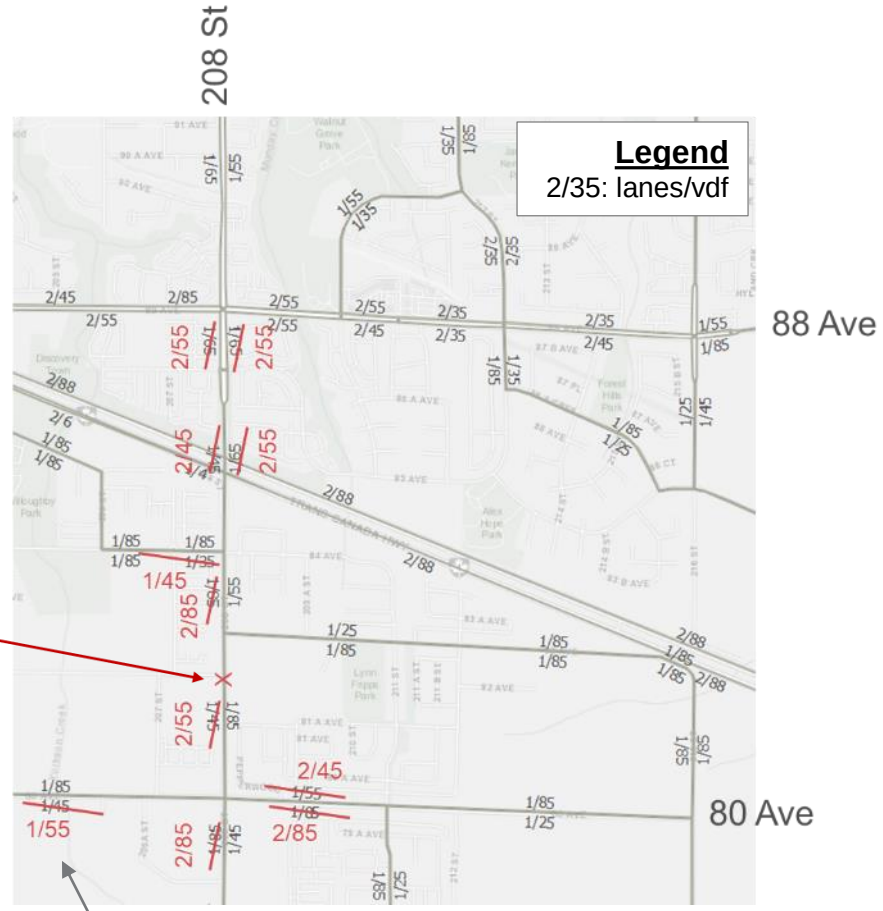
- Flagged the sections with issues
- Reviewed the network assumptions and applied fixes



Reviewed the network assumptions and applied fixes

- Recent construction projects
  - Road widening
  - New signals

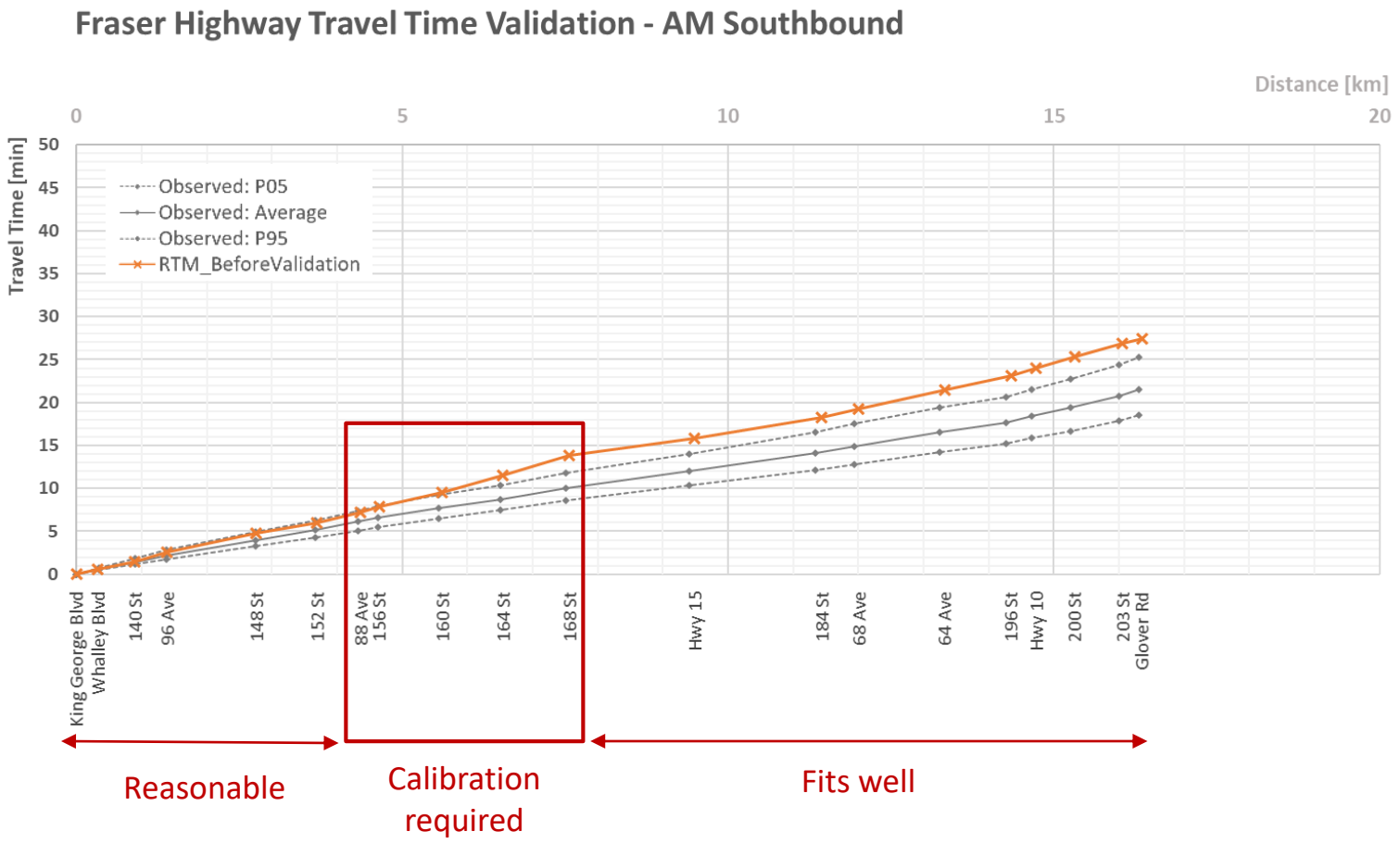




fixed outdated network coding

3. Detailed Review of the Project Corridor

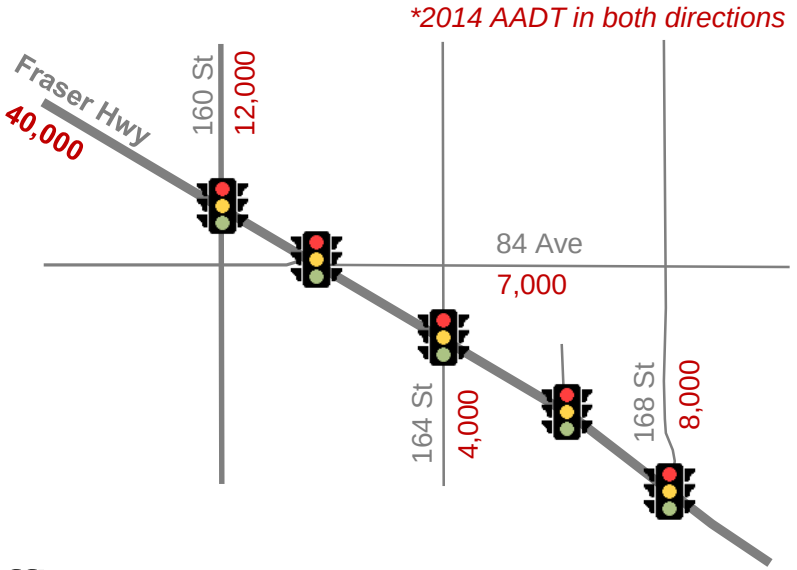
Calibrated the project corridor



Calibrated the project corridor

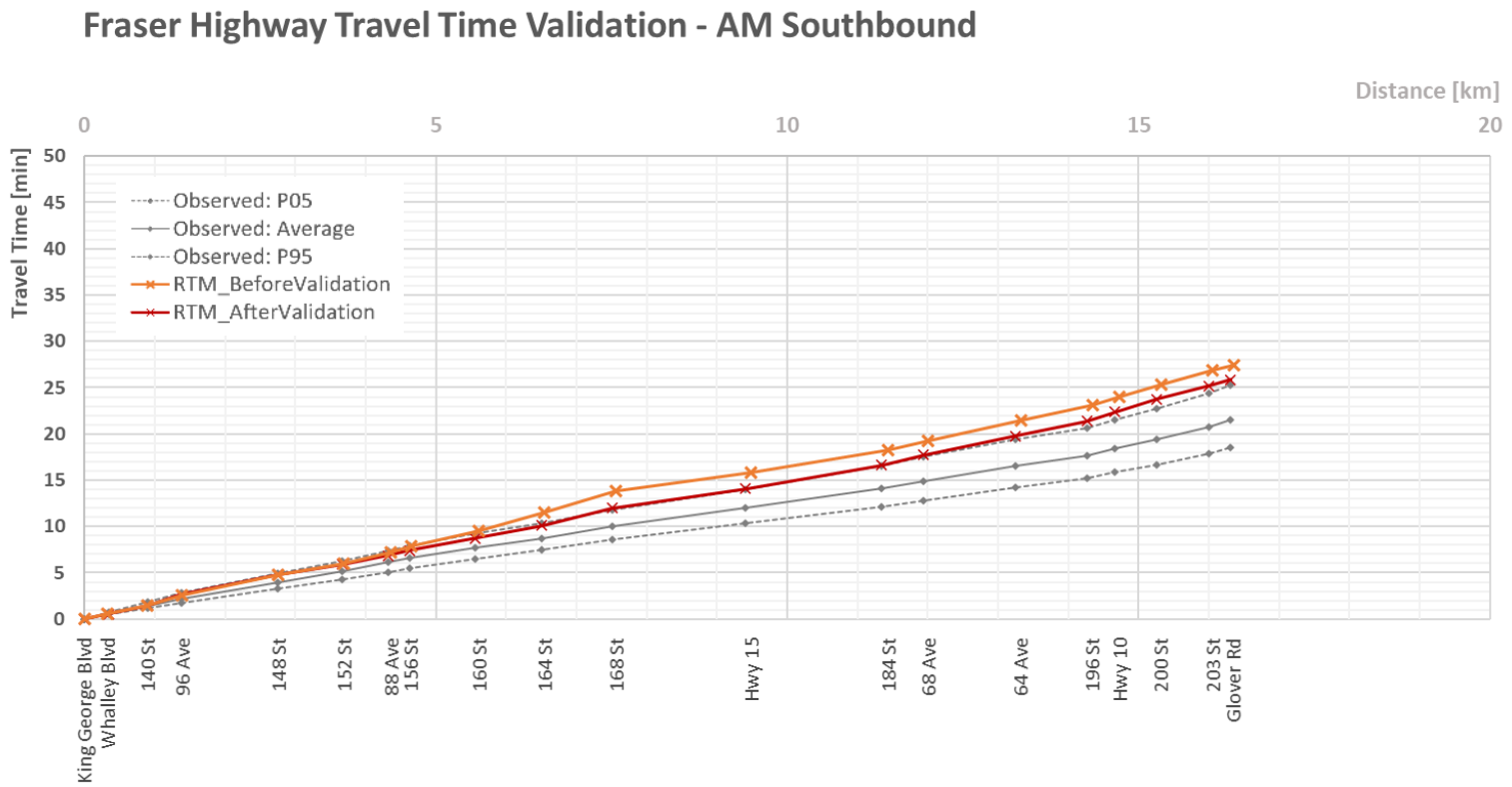
- Reviewed network coding:
  - speed limit
  - lanes
  - volume-delay functions (VDFs)
  - calibrated the capacity of the major movement
- Compared the modelled volumes to recent traffic counts
- Assessed the locations of centroid connectors
- Calibrated the signal delay (explicit attribute in VDF)

$$travel\ time = signal\ delay + freeflow\ time + volume\ delay$$



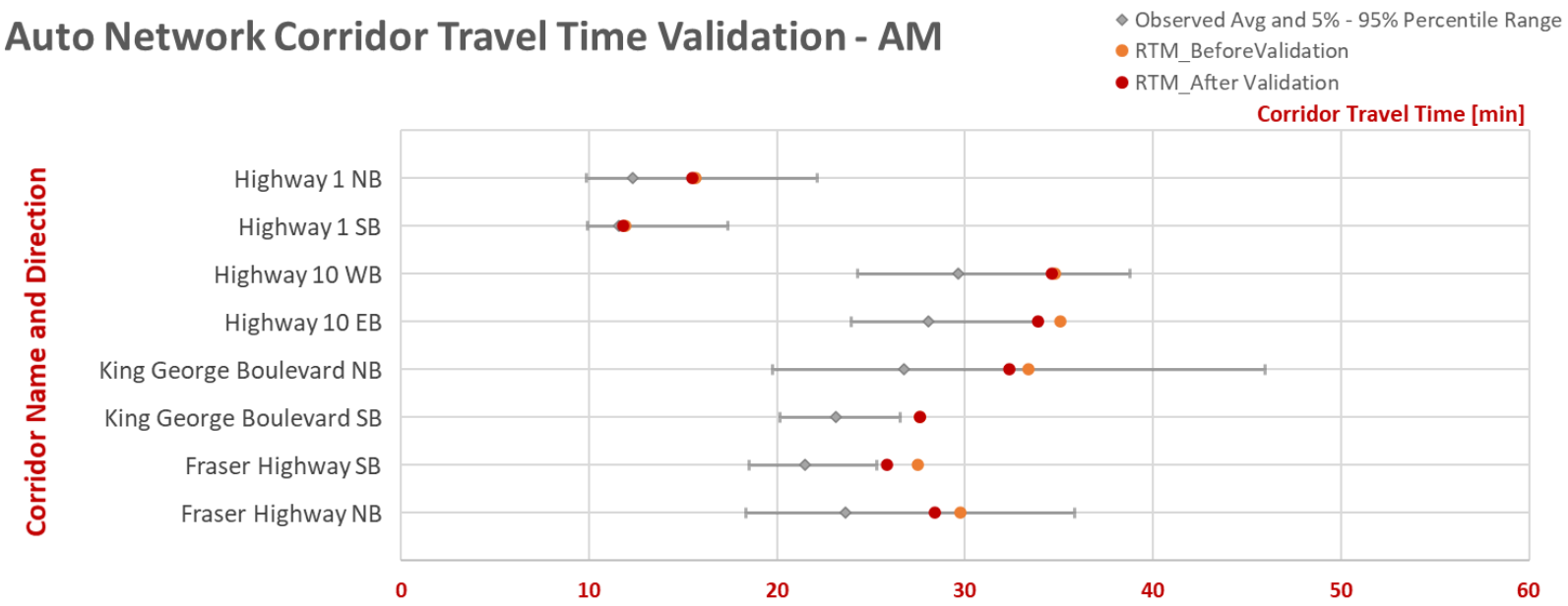
Validation Results

Calibrated the project corridor



Validation Results

- Modelled travel times are closer to the overserved range.
- Improved travel time validation results helped auto volume and transit ridership fit better to the observed data.



Lessons Learned

Travel time validation helps identify outdated network assumptions and prioritize areas for network review.

Common issues

- Link attributes
  - Speed limit
  - Number of lanes
  - Lane capacity (vdf)
    - T-intersections
    - Pedestrian Signals
    - Signal Coordination

Review green time allocation at the intersection.

- Node attributes
  - Turn restrictions
- Network connectivity
  - One-way streets

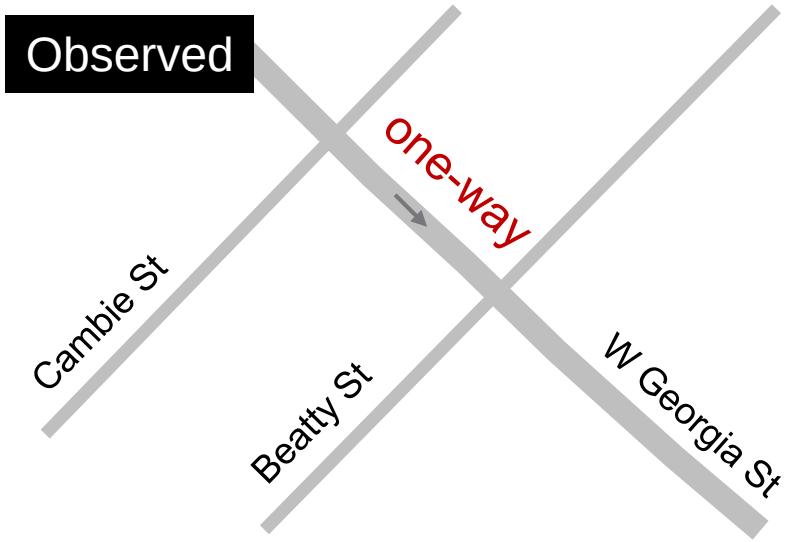
- Demand
  - Land use
  - Centroid Connectors
    Zone split / secondary access point?

- Driving Behavior
  - Grade
  - Speeding
  - HOV lane violation

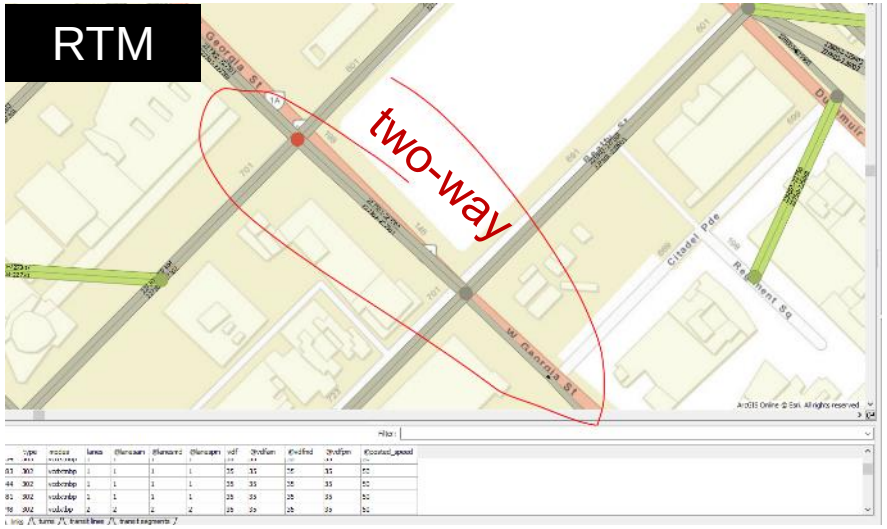
Network Connectivity Issue

- One-way street coded as two-way.

George St is one-way eastbound between Cambie St and Beatty St.



It was coded as a two-way street in the RTM.



Travel time validation provides confidence in the model's forecasting capability.

Question the numbers.