



City of Port Moody

Report/Recommendation to Council

Date: March 13, 2023
Submitted by: Engineering and Operations Department – Infrastructure Engineering Services Division
Subject: Cumulative Development Transportation Model – Results and Recommendations

Purpose

To update Council on the findings of the Cumulative Development Transportation Model project.

Recommended Resolution(s)

THAT Council receive the Cumulative Development Transportation Model, as described in the report dated March 13, 2023, from the Engineering and Operations Department – Infrastructure Engineering Services Division regarding Cumulative Development Transportation Model – Results and Recommendations for information;

AND THAT staff develop an ongoing maintenance and update plan for the Cumulative Development Transportation Model.

Background

On May 4, 2021, Council passed multiple motions regarding growth principles, including the following motion:

RC21/278

Development decisions will minimize big traffic impacts. Direct staff to develop a model and assumptions for projection of cumulative traffic impacts under various growth scenarios. Also, recommend maximum cumulative traffic congestion/average trip time targets during peak am and pm rush hour periods on key roadways crossing our city centre.

Staff recommended in an August 5, 2021 report to incorporate the work to develop the model into the Master Transportation Plan (MTP) Update, which was in active procurement at the time. Staff provided Council with a progress report during its September 27, 2022 meeting (**Attachment 1**) describing work by Mott MacDonald Canada Limited (Mott MacDonald).

Discussion

Attachment 1 describes two kinds of transportation models generally in use: “macroscopic” and “microscopic” models, the former being strategic in nature while the latter permit analysis of

local operational questions. TransLink maintains the Regional Transportation Model (RTM), a macroscopic model of regional transportation demand. Several Lower Mainland municipalities maintain “sub-area” models based on RTM to provide more local detail.

Project Objectives

The Cumulative Development Transportation Model (CDTM) project has the following objectives:

- Develop a model that requires fewer resources and less complexity than TransLink’s RTM, such that it is not an RTM sub-area model.
- Avoid purely static approaches that are too limited, and instead pursue an approach that can assess transportation demand and behavioural changes dynamically and over time.
- Provide local analysis output (such as need for turning bays, queue lengths, traffic signal timing updates and optimizations) while enabling strategic level transportation demand redistribution (such as trip departure time, mode, or route shifts).
- Recommend potential average trip time targets during peak AM and PM periods on key streets, and other metrics related to an inclusive and healthy transportation system that align with the MTP Update directions.
- Potentially support the MTP Update and the development of “Big Moves” within that planning process.
- Provide output beyond traffic metrics to be inclusive of all main modes.
- Determine a model/software purchase and maintenance strategy.

The above objectives were intended to help understand cumulative development impacts while also enabling staff to understand localized effects and inform the ongoing MTP Update project.

Cumulative Development Transportation Model

The recommended modelling tool, Visum SBA, conducts “simulation-based assignment” to enable an understanding of individual simulated vehicles while also enabling the model to be dynamic. This is an evolving area of modelling practice, called “mesoscopic modelling”, which seeks to combine the advantages of macroscopic and microscopic models. The model incorporates most significant roads within Port Moody in its network but also simulates individual vehicles at an intersection level. CDTM is essentially a local sub-area model of RTM that is limited to modelling car traffic during the morning peak hour. The morning peak hour was chosen because it generally has a more pronounced peak than the afternoon peak hour, and is also the time period when travellers are most schedule-sensitive (need to arrive at work or school on time, etc.). Additional resources would be required to extend the model to the afternoon peak hour.

Some potential output indicators were also reviewed, including travel time, travel time reliability, and a “congestion index” that would compare travel times in free flow conditions (typically at night) against peak hour travel times. Travel time was recommended as the preferred output indicator, as it is easy to understand and communicate, requires the lowest level of effort to obtain, and can most easily be monitored. The indicator could also easily be extended to consider other travel modes and cross-referenced against other data sources.

The model was calibrated by comparing estimated traffic volumes to historic traffic counts from 2017, which is the base calibration year of RTM, and reviewing travel times in multiple sample

corridors against diverse data sources, including Google Traffic and Streetlight data. Future scenarios were developed for 2035, which is a future year used in RTM and likely to be a close approximation of the 2030 planning horizon of the MTP Update.

Additional Modelling Approaches

Attachment 1 described how Mott MacDonald also reviewed alternative land use and transportation modelling approaches that could be considered in addition to the CDTM: walkability analysis and accessibility analysis. Walkability analysis can be used to help understand the effect of land use decisions, but is better used as a performance indicator than a forecasting tool. Accessibility analysis looks at access to opportunities, such as jobs within 40 minutes by public transit, and enables estimation of a relationship between destination accessibility and sustainable trip making. Accessibility analysis was used to inform one of the model scenarios, described next.

Model Scenarios

The CDTM was applied to model three scenarios, as follows:

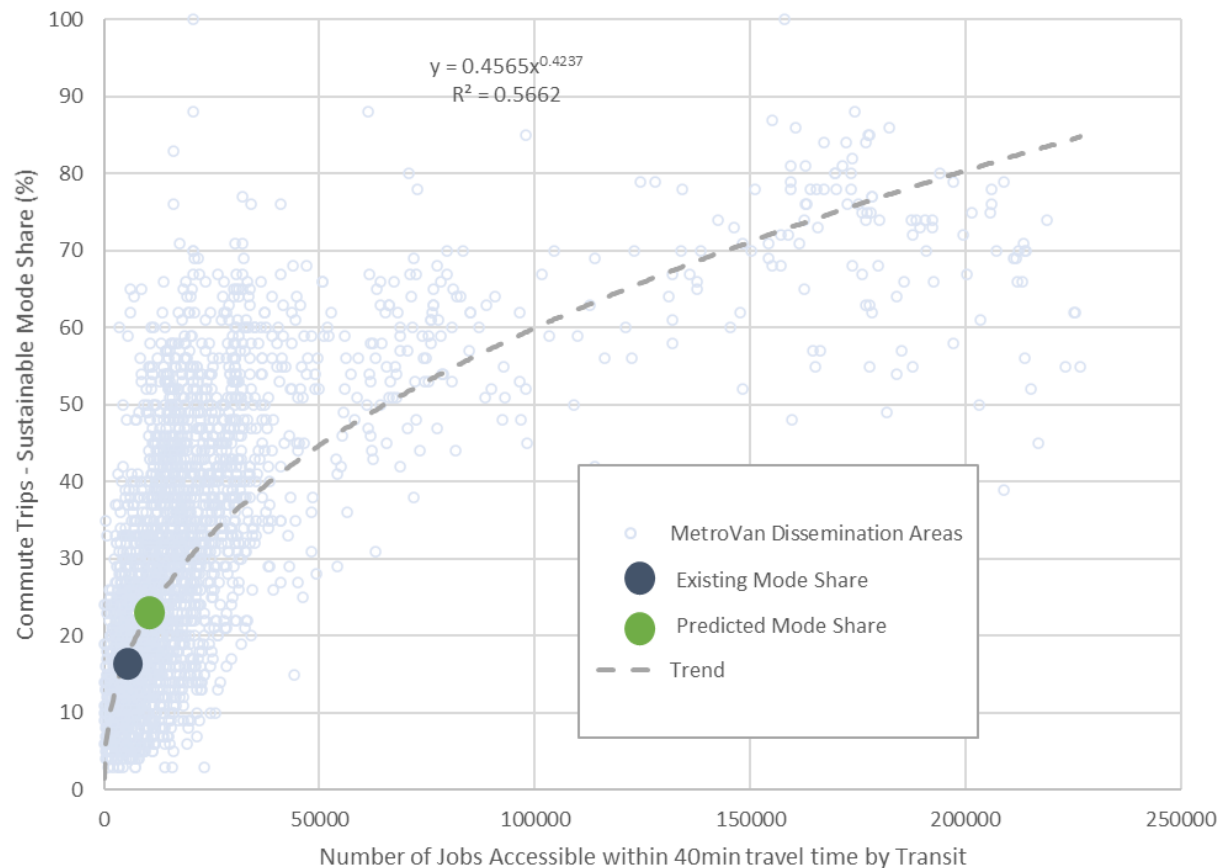
- 2017 Existing Conditions (Baseline) Scenario
- 2035 Future Development Scenario
- 2035 Increased Destination Accessibility Future Scenario

The 2017 Existing Conditions Scenario (Baseline) provides the closest available RTM information using land use similar to current conditions. The model was calibrated using this scenario as described above and travel time outputs are used as a reference against which the other scenarios are compared. Land use in this scenario was based on 2016 Census, used to calibrate the 2017 TransLink Trip Diary survey which was then used for the 2017 RTM.

The 2035 Future Development Scenario updates the land use data using forecasted information in RTM, adjusted for other known proposed developments such as Woodland Park. No significant transportation investments were modelled in this scenario. The modelled travel times across the various sample corridors resulted in an average travel time increase of about 2 minutes (about 18%) over and above current modelled conditions across all five modelled corridors.

The 2035 Increased Destination Accessibility Scenario used the same land use assumptions as the prior scenario, but recognizes that sustainable trip making may be influenced by future land use changes. **Figure 1** below uses the destination accessibility relationship described above to estimate a revised sustainable mode share for 2035 based on changed land use, which suggests that planned development can be anticipated to lead to a 4% shift towards transit, walking, and cycling, from 18% today to 22% by 2035. A 4% mode shift translates to approximately 5% fewer vehicle trips relative to current travel behaviour, so vehicle trips were adjusted by this amount and travel time impacts compared to 2017 were again reviewed. This scenario estimates about 40% less travel time impacts on average (1 minute 18 seconds rather than 2 minutes 3 seconds across all five modelled corridors) compared to the prior scenario, reinforcing the need for developments in Port Moody that enable access to a variety of destinations.

Figure 1: Mode Share Estimate based on Increased Destination Accessibility



Travel Time Threshold Recommendation

Mott MacDonald reviewed the results of the 2035 Increased Destination Accessibility Scenario to determine rough thresholds for travel time increase. It should be recognized that there is no strictly technical basis for setting maximum travel time increase thresholds, and communities need to balance travel time increase with other considerations such as accessibility, provision of safe alternatives to cars, and others. Mott MacDonald's review recommends a vehicular travel time increase threshold for specific developments of within 2 minutes, and up to 5 minutes in exceptional cases, for long cross-city corridors. For shorter individual road segments, a recommendation of up to 32 seconds per roadway kilometre would align with typical qualitative metrics in use in the transportation industry.

Applicability to the MTP Update

The MTP Update has a goal of increasing Port Moody's sustainable mode share from approximately 20% to 40% by 2030, which could reduce the number of private vehicle trips by 30% or more compared to not achieving the goal. The CDTM could be applied to estimate the effects on vehicle traffic within Port Moody because of proposed policies, programs, and projects in the MTP Update. As described above, a relatively modest increase in the sustainable mode share of 4%, reducing private vehicle trips by about 5%, is estimated to significantly reduce the increase in travel time brought about by increased demand from population and employment growth. Therefore, achieving the MTP Update mode share target could have a significant impact on vehicle travel times within Port Moody.

Model Maintenance Options

Attachment 1 reviewed the various options available for CDTM maintenance. Mott MacDonald concluded that the External Custodianship and Retainer option would provide the City the most value for money based on current understanding of need for transportation modelling. An annual funding program of \$5,000 would accommodate likely minor maintenance and enable the City to also budget for larger, periodic maintenance that would be required when major changes occur, such as the release of a new version of TransLink's RTM.

Recommendations

Staff recommend receiving the CDTM for information and for the City to develop an ongoing CDTM maintenance and update plan, as transportation models require ongoing maintenance to remain relevant.

Other Option(s)

If Council wishes to not maintain the CDTM going forward, an alternative resolution might be:

THAT Council direct staff to receive the Cumulative Development Transportation Model for information.

The CDTM would gradually become less representative of travel conditions as its foundational data and assumptions become more outdated.

Financial Implications

The recommendation to enter into a custodianship and retainer agreement for the CDTM will result in a variable annual cost depending on usage of the model, but estimated to be about \$5,000. There are no appropriate existing funding programs for this purpose, so this would be an added cost which, if approved, staff will add to future 5-Year budget plans. Application of the CDTM on the MTP Update could be funded from the existing project.

Communications and Civic Engagement Initiatives

Development of the CDTM was an internal project with no engagement activities. However, as it is planned to be used to support the MTP Update, output from the CDTM may appear in future MTP Update engagement materials.

Council Strategic Plan Objectives

Development of the CDTM aligns with the Community Evolution strategic priority from the 2019-2023 Council Strategic Plan by helping to ensure future community growth is carefully considered and strategically managed consistent with the targets approved in the City's Official Community Plan.

Attachment(s)

1. Staff report dated June 29, 2022 regarding Cumulative Development Transportation Model – Update discussed at the Council meeting on September 27, 2022
2. Port Moody Cumulative Development Traffic Model – Report from Mott MacDonald Canada Limited

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Report Approval Details

Document Title:	Cumulative Development Transportation Model - Results and Recommendations.docx
Attachments:	- Attachment 1 - Cumulative Development Transportation Model – Update.pdf
Final Approval Date:	Mar 20, 2023

This report and all of its attachments were approved and signed as outlined below:

Devon Brownlee for Stephen Judd, Manager of Infrastructure Engineering - Mar 13, 2023 - 12:10 PM

Jeff Moi, General Manager of Engineering and Operations - Mar 13, 2023 - 2:11 PM

Stephanie Lam, City Clerk and Manager of Legislative Services - Mar 13, 2023 - 4:45 PM

Lindsay Todd, Manager of Communications and Engagement - Mar 13, 2023 - 4:56 PM

Paul Rockwood, General Manager of Finance and Technology - Mar 14, 2023 - 11:29 AM

Tim Savoie, City Manager - Mar 20, 2023 - 1:52 PM