

Valley Line West - Traffic on Jasper Avenue Reconstruction

Recommendation

That the October 30, 2018, Integrated Infrastructure Services report CR_6239, be received for information.

Previous Council/Committee Action

At the October 23, 2018, Agenda Review Committee meeting, the October 29, 2018, Integrated Infrastructure Services report CR_6239, was re-routed to the October 30, 2018, Urban Planning Committee meeting.

At the July 5, 2018, Executive Committee meeting, the following motion was passed:

That Administration complete an analysis on the impacts to traffic of the Jasper Avenue reconstruction and the Valley Line West, including mitigation options such as:

- Traffic couplets
- Reversible Lanes
- Smart traffic signals

Executive Summary

Together, the Valley Line West LRT construction and Imagine Jasper Avenue reconstruction projects will change travel patterns for people moving between Downtown and the west end of the city by improving mode choice for users and improving the people-moving capacity of the City's transportation network. The implementation of these projects, however, will result in a net overall reduction in vehicular travel lanes that will influence how motorists move into and out of these areas.

In addition to the Valley Line West and Jasper Avenue projects, several other transformative transportation projects have influenced the transportation network supporting travel between Downtown and west Edmonton. Projects such as the 102 Avenue bike lanes have changed the transportation network and influenced how people move in the area by allowing for more travel mode options.

This report provides information related to the construction related impacts to motorists and analyzes strategies to mitigate those impacts. Based on the assessment outlined, the potential mitigation scenarios of a traffic couplet or reversible lanes do not provide sufficient benefit to justify the impacts to the pedestrian-friendly Main Street vision for Jasper Avenue. Proceeding with the current design will better balance traffic impacts with the transformative vision for Jasper Avenue. The potential use of Adaptive Traffic Signal Controls - ATSC (or similarly referred to as Smart Signals) is not likely to provide opportunity for the Jasper Avenue corridor but will require further evaluation as to the benefits as more detailed information is obtained regarding the ATSC pilot projects.

Report

Together, the Valley Line West LRT construction and Jasper Avenue reconstruction projects will change travel patterns for people moving between Downtown and the west end of the city by improving mode choice for users and increasing the overall people-moving capacity of the City's transportation network. The implementation of these projects, however, will result in an overall reduction in vehicular travel lanes that will influence how motorists move into and out of these areas.

In addition to the Valley Line West and Jasper Avenue projects, several other transformative transportation projects have influenced the transportation network supporting travel between Downtown and west Edmonton. Projects such as the 102 Avenue bike lanes have changed the transportation network and influenced how people travel in the area.

This report provides information related to the impacts to motorists resulting from the construction of these projects and analyzes strategies to mitigate those impacts.

Administration utilized the City's Regional Travel Model and Dynamic Traffic Assignment tools, along with other qualitative criteria, to explore the effectiveness of mitigation scenarios for managing changes in traffic in comparison with the currently recommended plans for the road network between Downtown and west Edmonton. Mitigation scenarios included reversible lanes and one-way couplet systems, which are defined later in the report. As part of the review, factors such as network operations, safety, pedestrian connectivity, emergency access, and impacts on business and stakeholders were also considered.

Mitigation Measures

Currently, the implementation of the recommended plans for Jasper Avenue and Valley Line West LRT will result in the following transportation network changes to vehicular travel between Downtown and west Edmonton, with the currently planned configuration shown in Attachment 1:

- Valley Line West LRT:
 - Stony Plain Road (156 Street - 120 Street):
 - Current: four travel lanes
 - Planned: two travel lanes; bus service replaced with LRT service
 - 104 Avenue / (116 Street - 106 Street):
 - Current: six travel lanes
 - Planned: four travel lanes; bus service replaced with LRT service
- Jasper Avenue Reconstruction:
 - Jasper Avenue (124 Street to 121 Street):
 - Current: four travel lanes; buses share outside lanes with vehicles
 - Planned: four travel lanes; buses share outside lanes with vehicles
 - Jasper Avenue (121 Street - 109 Street):
 - Current: four travel lanes, plus two peak hour bus-only lanes / off peak parking lanes
 - Planned: four travel lanes; buses share outside lanes with vehicles

To evaluate traffic changes following the completion of the Jasper Avenue reconstruction and Valley Line West LRT projects, as well as measures to mitigate these impacts, road network reconfiguration scenarios were reviewed and compared with the two-way concept design. The following scenarios were evaluated:

Scenario 1 - Traffic Couplet

A traffic couplet system utilizes two approximately parallel roadways in proximity to one another, serving travel in an area by providing opposing one-way traffic accommodation.

A one-way couplet system was examined by proposing the conversion of two, two-way streets into a traffic couplet comprised of Jasper Avenue for eastbound travel into Downtown and 100 Avenue westbound out of Downtown. For the analysis, this was accomplished by modifying Jasper Avenue to three lanes eastbound and one lane westbound. Adjustments to Jasper Avenue also included a two-way left-turn lane for the segment between 119 Street and 109 Street. Further, 100 Avenue was adjusted to two lanes westbound with no left turns and no parking between 121 Street and 109 Street. This scenario is depicted in Attachment 1.

This configuration, however, is not a traditional traffic couplet, as the road network adjustments to Jasper Avenue continue to provide for two-way travel instead of the one-way travel that would be indicative of a traditional couplet system. The provision of a westbound lane on Jasper Avenue in this scenario was a factor of providing

necessary access for business operations and transit service, in addition to the limited number of travel lanes in the network that provide for westbound travel out of Downtown.

Scenario 2 - Reversible Lanes

In this scenario, signals and overhead displays are used to create reversible lanes that permit traffic to flow in different directions during different times of day to provide additional capacity for peak traffic flows. Reversible traffic lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. Examples include 97 Street north of 118 Avenue.

For the purposes of this report, the following configuration was applied to the analysis:

- Jasper Avenue (124 Street to 109 Street):
 - Morning peak: one westbound lane and three eastbound lanes. In addition, a continuous left turn lane is provided between 119 Street and 109 Street.
 - Afternoon peak: three westbound lanes and one eastbound lane.
 - Off-peak: two travel lanes in each direction with a continuous left turn lane.

Both scenario 1 and scenario 2 would require 102 Avenue between 142 Street and 124 Street to be converted into two eastbound lanes and one westbound lane during peak hours with a two-way left turn lane. The lane configurations for the scenarios examined are shown in Attachment 1.

Adaptive Traffic Signal Control (ATSC)

On September 11, 2018, Administration presented report CR_6169 Smart Traffic Signals Pilot Corridors - Criteria and Recommendations to Urban Planning Committee for information. The report highlighted criteria and recommendations for possible Adaptive Traffic Signal Control (ATSC) pilot corridors in addition to the regular capital replacement of traffic signals. The report noted that the City could realize efficiencies and cost-saving measures by implementing ATSC in conjunction with planned upgrades to existing traffic signals.

Jasper Avenue was not identified as a pilot corridor for use of adaptive signal technology at this time. Jasper Avenue has predictable travel patterns and the vision is to enhance pedestrian movement along the the avenue. With these conditions, there is uncertainty about the effectiveness of the ATSC application on this corridor and it is not recommended at this time for the Jasper Avenue reconstruction project. However, it is expected that the project will include traffic signaling enhancements to optimize

flow of pedestrian and vehicle traffic. Ongoing monitoring of this technology along with our local pilots results will inform next steps.

Mitigation Measures - Findings

Analysis was completed to examine how traffic impacts of the Valley Line West LRT and Jasper Avenue reconstruction projects may be addressed through the application of measures such as traffic couplets, reversible lanes, or ATSC. Overall people-moving capacity, in addition to maintaining or improving the motor vehicle moving capacity, is an important consideration in analyzing measures to mitigate traffic impacts. Traffic volume levels, corridor travel times, congestion levels, and travel delays also provide indicators of transportation projects' impact on road networks.

Each of the two scenarios has unique benefits and impacts that are summarized below.

Traffic Analysis

Using a 2027 horizon year, Administration conducted traffic analysis using the City's Regional Travel Model and Dynamic Traffic Assignment tools for traffic modelling purposes. Key assumptions in the models include: the Valley Line LRT is in full operation between Mill Woods and Lewis Farms, and the Yellowhead Trail Freeway Conversion and Groat Road improvements are completed. Results of the traffic analysis showed:

- Compared with the recommended concept plan scenario, the traffic couplet and reversible lane scenarios can be expected to result in traffic diversion among the major east-west corridors between Downtown and West Jasper Place. However, the total traffic entering or leaving Downtown using these corridors for west residents (e.g. River Valley Road, Victoria Road / 100 Avenue, Jasper Avenue, 102 Avenue, Stony Plain Road, 107 Avenue, and 111 Avenue) is expected to be in the same range during the morning or evening peak hours for all three scenarios.
- Corridor-level travel time comparisons showed very minimal to no difference between the traffic couplet scenario and the recommended concept plan configuration. However, the reversible lane scenario demonstrated slight improvement in corridor travel time during the peak hours.
- For the Downtown area, traffic performance indicators such as vehicle-kilometers travelled (VKT), vehicle-hours travelled (VHT) and vehicle-hour delay (VHD) show that the traffic couplet scenario is expected to lead to a marginal increase in overall congestion, while the reversible lane scenario is expected to lead to a slight decrease in overall congestion.
 - Traffic couplet: 7 percent increase in VHD in the afternoon peak
 - Reversible lanes: 5 percent decrease in VHD in the PM peak

- Outside the Downtown area, indicators for the overall network do not show major differences between scenarios
- Jasper Avenue is constrained on both ends, upstream with four lanes at 124 Street /102 Avenue and downstream in Downtown as four lanes on Jasper Avenue. Implementing different scenarios in between (traffic couplet or reversible lanes) will not result in a significant overall benefit.

Other Factors

In addition to traffic analysis, there are a number of other factors to consider when examining the benefits and impacts of the mitigation measures described in this report. Factors such as business impacts, operational impacts, capital cost, and safety all play a part in evaluating the best holistic transportation network configuration.

Implementing traffic couplet or reversible lane configurations to manage vehicular traffic would have additional impacts, including:

- Traffic Couplet:
 - Possible increase in emergency vehicle response time due to one-way traffic movement.
 - Pedestrian travel times are increased as a result of the vehicle directions being split across two different corridors.
 - Potential operational and delivery impacts for businesses due to loss of access and travel lanes.
 - Impact to the vision for Jasper Avenue as a Main Street
- Reversible Lanes:
 - Aesthetic impacts (visual clutter) from additional signage and signal control.
 - Impact to the vision for Jasper Avenue as a Main Street.
 - Possible operational issues due to changing operating patterns (higher driver confusion, potential increased frequency of collisions, increased queuing or loss of access due to left turns).
 - While a peak/off-peak directionality can be established for general traffic, this is more challenging for public transit service as core routes travelling on Jasper Avenue have high demand in both directions.

In both cases, planning for the Jasper Avenue corridor would need to be updated, including new public engagement to explore the alternative design mitigations and cost impacts.

A table summarizing the results of the mitigation measures analysis is included in Attachment 2.

Conclusion and Next Steps

Based on the assessment outlined, the traffic couplet or reversible lanes scenarios offer little to no travel time benefits for vehicles. Proceeding with the current design strikes the best balance between traffic impacts and creating a pedestrian friendly corridor consistent with the transformative vision for Jasper Avenue.

Administration will monitor the outcomes of upcoming pilots for ATSC and other strategies included in the smart transportation action plan for opportunities to apply emerging technologies to these corridors.

An important next step is to raise further awareness and to demonstrate the benefits and tradeoffs of the planned Jasper Avenue Main Street prior to implementation. In addition, Administration continues to refine cost estimates through the finalization of the preliminary design for Council's consideration as part of the 2019-2022 Capital Budget deliberations.

Public Engagement

Broader public engagement for the Valley Line West LRT and Jasper Avenue projects is ongoing, with specific activities planned for each project. Further details related to the public engagement activities for Jasper Avenue, as well as a summary of outcomes for these projects, were presented to Executive Committee on May 23, 2017 (CR_3323), January 29, 2018 (CR_4890), and July 5, 2018 (CR_5628).

No further engagement has been undertaken in support of this report. In both scenarios presented, planning for the Jasper Avenue corridor would need to be updated, including new public engagement to explore the alternative design mitigations and cost impacts.

Corporate Outcomes and Performance Management

Corporate Outcome(s): Edmontonians are connected to the City in which they live, work and play			
Outcome(s)	Measure(s)	Result(s)	Target(s)
Edmontonians are connected to the City in which they live work and play	Edmontonians' Assessment: Connected to Community (percent of survey respondents who feel connected)	47% (2017)	45% (2017 Target)

Corporate Outcome(s): Goods and services move efficiently			
Outcome(s)	Measure(s)	Result(s)	Target(s)
Goods and services move efficiently	Business Satisfaction: Goods and Services Transportation (percent of survey respondents who are satisfied/very satisfied)	50.5% (2017)	53.0% 2018
	Travel Time and Reliability for Goods and Services Movement (time in minutes: seconds to drive 10km route)	10:09 (2017) - 50% of the time 13:35 (2017) - 85% of the time	12:30 (2018) - 50% of the time 16:00 (2018) - 85% of the time
Corporate Outcome(s): Edmonton is attractive and compact			
Edmonton is attractive and compact	Edmontonians' Assessment: Well-designed attractive city (percent of survey respondents who agree/strongly agree)	53% (2017)	55% (2018)

Attachments

1. Road network reconfiguration scenarios
2. Scenario Analysis Summary Results (2027 Horizon Year)

Others Reviewing this Report

- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- C. Owen, Deputy City Manager, Communications and Engagement
- G. Cebryk, Deputy City Manager, City Operations
- P. Ross, Acting Deputy City Manager, Urban Form and Corporate Strategic Development