

16 AVENUE / 19 STREET NE INTERCHANGE FUNCTIONAL PLANNING STUDY

EXECUTIVE SUMMARY

This report outlines the functional planning study that was completed for the 16 Avenue / 19 Street NE intersection by Transportation Planning with the assistance of Delcan (Consultant). The main purpose of this study was to develop an interchange plan and determine the potential impacts the future interchange may have at both the upstream and downstream interchanges at both Deerfoot Trail and Barlow Trail. A summary of the public engagement program undertaken as part of this study is included.

The study considered numerous interchange options. The project team developed evaluation criteria to compare all alternatives that included traffic operations, connectivity, accessibility, safety, property impacts, emissions, constructability, costs, and benefit cost analysis. According to the evaluation results and the majority opinion from the public engagement, the project team recommends the plan as shown in Figure E7 in Attachment 1.

Having considered the total capital cost of the recommended ultimate plan would be around \$ 203 million, the project team conducted construction staging plans and searched for short term solutions. The recommended construction staging plans are included in Attachment 1 and cost estimates for each stage are summarized as follows:

- Stage 1: \$ 12 million;
- Stage 2: \$ 25 million;
- Stage 3: \$ 37 million;
- Stage 4: \$ 131 million;
- Total Staged Cost \$ 205 million.

Note the difference between the total recommended plan construction cost (\$203 million) and the total staged cost is attributed to the construction of temporary ramp connections between Stage 3 and Stage 4. Stage 4 includes the construction of the 3rd level structure over Deerfoot Trail and the west facing 19 Street ramps including two basket weave structures.

It also should be noted that within the 2014-2025 Investing in Mobility Plan the project cost has previously been estimated at \$105 million, however the comparable cost based on the current study could see Stages 1, 2 and 3 completed at an estimated cost of \$74 million. The construction of this project can be staged based on the future available funding.

ADMINISTRATION RECOMMENDATION(S)

That the SPC on Transportation and Transit recommends that Council:

1. Approve the Executive Summary for the 16 Avenue / 19 Street NE Functional Planning Study including the recommendations contained on pages E15-E20 of Attachment 1;
2. Direct Administration to acquire the additional right-of-way required for Stage 3 construction on an opportunity basis as shown in Attachment 2; and
3. Direct Administration to investigate disposal of the residual land resulting from the realignment of the Barlow Trail and 16 Avenue interchange as shown in Attachment 3.

Approval(s): Logan, Malcolm concurs with this report. Author: Xu, Jeffrey
City Clerk's (C. Smillie)

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RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2014 NOVEMBER 05:

That the Administration Recommendations contained in Report TT2014-0852 be approved.

Opposition to Recommendations:

Opposed: R. Jones

PREVIOUS COUNCIL DIRECTION / POLICY

At the 2014 May 26 Meeting of Council, Council received TT2014-0308 Report “Investing in Mobility Update” and approved “Investing in Mobility: 2015-2024 Transportation Infrastructure Investment Plan”. The 16 Avenue NE and 19 Street NE Interchange project is listed on Page 41 in the 2015-2024 Investing in Mobility Plan as a high priority unfunded project.

BACKGROUND

16 Avenue NE is an important road in the City transportation network and serves as part of the Trans Canada Highway. This section of 16 Avenue NE is currently constructed as a 6 lane roadway with a signalized intersection at 19 Street NE. There are existing interchanges along 16 Avenue NE at both Deerfoot Trail and Barlow Trail. The segment of 16 Avenue between 19 Street NE and Deerfoot Trail is the busiest section of the Trans Canada Highway within Calgary and currently carries over 80,000 vehicles per day. Based on the existing available information, 16 Avenue and 19 Street intersection has received fourteen 311 calls per year in average, experiences high collision rates and fails to provide enough capacity to satisfy traffic demand during peak hours.

Prior to this study, The City completed three previous studies that recommended improvements to 16 Avenue and 19 Street intersection; the Trans Canada Highway – East Functional Planning Study (1978), the Barlow Trail North Functional Study (1986), and the Deerfoot Trail Corridor Study (1998). However, there is no City Council approved plan available at this location.

In the Trans Canada Highway – East Functional Planning Study (1978), there was a plan for an interchange at 16 Avenue and 19 Street NE intersection. Included in this report was the recommendation that changes be made at Deerfoot Trail and Barlow Trail in order to accommodate the new proposed interchange at 19 Street NE.

The Barlow Trail North Functional Study (1986) also provided a recommended plan for an interchange at 16 Avenue and 19 Street. This study proposed a tight diamond interchange while the previous study only recommended a half interchange. The most significant difference between these two reports is how the traffic movements on the north side of 16 Avenue were proposed to be handled.

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The Deerfoot Trail Corridor Study (1998) recommended that additional eastbound and westbound lanes between Deerfoot Trail and 19 Street be added to help in improving traffic capacity.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

The main objectives of this study were to identify constraints, develop a comprehensive engagement plan, review traffic conditions, generate interchange configuration alternatives and evaluate the alternatives based on proper criteria, and prepare functional design of the preferred solution.

At the initial option development stage, a total of 15 options were assessed based on high level criteria. The criteria include cost, weaving and merging/diverging analysis, traffic capacity, property impacts, accessibility, signage complexity, and constructability. According to the evaluation, the project team shortened the options to a total of six options.

The short listed options were presented to an external stakeholder workshop on 2013 September 11, where feedback was solicited. After incorporated the feedback from the workshop, the project team further shortened the number of options to four. These four options are included on pages E5-E8 in Attachment 1.

More detailed evaluation criteria were then developed in order to assess each option. The criteria include traffic operation, connectivity and accessibility; safety; property impacts; vehicle emissions; constructability; costs; travel time savings; and benefit cost analysis.

Based on the travel time savings and the ability to provide improved pedestrian / cycling connectivity via a north-south regional pathway along the west side of Barlow Trail, it was recommended that Option 2 be moved forward. The detailed evaluation summary is included in Table E2 on pages E10 and E11 in Attachment 1.

The key components and features of the recommended plan as show in Figure E7 on page E16 include:

- Modified split diamond interchange along 16 Avenue at 19 Street and at Barlow Trail, with a tight diamond configuration at 19 Street;
- Through lanes on 16 Avenue on a 3rd level structure located over the existing Deerfoot Trail interchange;
- Six lane cross section on 19 Street overpass with buffered bicycle lanes in both directions between 18 Avenue and 14 Avenue;
- Lowered grade on 16 Avenue to pass under 19 Street; 19 Street remains at its existing grade;
- A loop ramp for the eastbound to northbound movement at Barlow Trail with two signalized intersections along Barlow Trail;
- Barlow Trail widened to a six lane cross section between the new south intersection and 23 Avenue;
- Regional pathways provided in the east west direction on both sides of 16 Avenue and in the north south direction at 19 Street and at Barlow Trail.

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The recommended improvements include both new routes and enhancements to existing pedestrian and bicycle facilities. New pathways and bikeways will provide linkages between facilities in areas that were previously not served, or underserved, for active transportation. Additional 3 metre wide regional pathways have been provided at major roadways, connecting the pathway across major arterial crossings using signalized intersections at 19 Street, Barlow Trail and 16 Avenue. In addition, on-street bike lanes have been included on 19 Street to improve bicycle connectivity between communities north and south of 16 Avenue. Transit exchanges for the future North Crosstown Bus Rapid Transit at 19 Street have also been provided.

The potential improvements would have impacts on five surrounding landowners; however, the recommended plan keeps the impacts to a minimum. The total impacted area was estimated as 0.4 hectares. The additional right-of-way required for this project is shown in Attachment 2. In addition, there would be residual land resulting from the realignment of the Barlow Trail and 16 Avenue interchange as shown in Attachment 3. While no detailed assessment of marketability and developability of these residual lands was completed as part of this study, 5.0ha of land that could be made available on both the east and west sides of Barlow has been identified as surplus to the current interchange.

Stakeholder Engagement, Research and Communication

According to The City's Engage! Policy, the project team was able to encourage participations from communities and key stakeholders and gained valuable input that fed into the decision making process. More than 280 people attended the open houses, information session, completed online surveys, and attended stakeholder meetings and workshops.

In total, three public open houses and two external stakeholder meetings were held. The first stakeholder meeting was held on 2013 April 30 at the Radisson Hotel Calgary Airport. A total of 50 stakeholders were invited and 27 attended this meeting. The main objectives of this meeting were to provide project background, identify issues and concerns, and gather feedback. According to the feedback, traffic congestion and business/community access were viewed as the highest concerns; others included community enhancements, safety for pedestrians, motorists and cyclists, and motor vehicle speed.

The first public open house was held on 2013 May 22 at the Crossroads Community Association. A total of 117 people attended. The purpose of this open house was to collect input from public about the community's needs, concerns or issues. The main concerns included traffic congestion, safety for pedestrian and motorists, traffic signal timing, short-cut through local communities, and walkability.

The second stakeholder meeting was held on 2013 September 11 at the Crossroads Community Association. A total of 59 stakeholders were invited and 10 stakeholders attended this workshop. The main purpose of this meeting was to gather input from stakeholders to refine and select the short listed options. Four options were picked from this workshop and most stakeholders preferred free flow traffic on 16 Avenue.

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A total of 60 people attended the second open house that was held on 2013 December 4 at the Vista Heights School. This open house reviewed the project details and presented the previous public feedback, including the issues, challenges, a review of different options, option evaluation criteria, and the next step of this project.

A total of 68 people attended the last public information session on 2014 March 13 at the Crossroads Community Association. The purposes of this open house were to present the recommended plan, inform the community how public input was used in the decision making process, and briefly introduce the next step of this project as it moves to City Council for approval. Most respondents said the information presented met their expectation and the response to their questions was satisfactory. The majority of respondents said the recommended plan reflected their feedback and support it. Almost all respondents said they had enough opportunity to provide feedback and the public engagement process met their expectation.

In summary, most respondents said the information presented in the open houses met their expectation and the majority of respondents support the recommended plan. Almost all respondents said they had enough opportunity to provide feedback and almost all respondents said the response to their questions was satisfactory.

Strategic Alignment

The study objectives were in alignment with Calgary Transportation Plan (CTP), Complete Street Guidelines, and the 202 Sustainability Direction including:

- Transportation Goal #5 to Promote economic development by providing smooth and efficient movement of people and goods (CTP3.4);
- 'Improving Goods Movement' 2020 objective by providing free-flow operations on the Trans Canada Highway;
- Transportation Goal #1 by providing better connectivity for major City roadways;
- TBL and 'GHG Emission Reduction' 2020 Objective by easing congestion through the removal of a bottleneck; and
- CTP 3.6 Objective by improving quality of service along the Trans Canada Highway by reducing travel times.

This project is listed in the 2015-2024 Investing in Mobility as a high priority unfunded project.

Social, Environmental, Economic (External)

The recommended improvements were estimated to reduce the network travel time in a total of 1,593 hours (12% reduction) during current peak hours and a total of 3,872 hours (25% reduction) in 2039. After converting the time savings to greenhouse gas (GHG) emission reduction, it was estimated that the GHG emissions would reduce 0.79% based on the existing traffic volumes and 0.01% in the year of 2039, thus no net increase in GHG emission with the growth in future traffic. The recommended improvements are in alignment with the Calgary Community Greenhouse Gas Reduction Plan.

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The potential improvements not only would improve the goods movement, but also would improve the connectivity and accessibility for all transportation modes, including pedestrian, cyclist and public transit.

Financial Capacity

Current and Future Operating Budget:

In the future after the interchanges are built, the operating budget will be higher than the current cost due to the additional signalized intersection operation costs. The additional operating cost was not quantified in this study.

Current and Future Capital Budget:

The total capital cost for the construction of the 16 Avenue / 19 Street NE interchange, with the recommended changes at both the Barlow Trail and Deerfoot Trail interchanges is estimated at \$203 million. To develop a possible construction staging strategy, the recommended plan was reviewed with respect to a number of key issues and challenges including utility conflicts, property impacts, costs, and overall ease of construction. Through this review, four distinct stages were identified in which the recommended plan could be delivered over a number of years. The four distinct stages for delivering the recommended plan are illustrated in Figures E11-E14 on page E21 of Attachment 1 with associated cost for each stage:

- Stage 1: \$12 million - it is the short term solution for the construction of the south half of the Barlow Trail interchange ramps, south ramp terminal intersection, widening of Barlow Trail between 16 Avenue and 7 Avenue, and widening of 16 Avenue to provide a third continuous eastbound lane between 19 Street and 36 Street.
- Stage 2: \$25 million – it includes the works to complete the north half of the Barlow Trail interchange and the major property acquisition.
- Stage 3: \$37 million – it includes the construction of 19 Street overpass and interchange ramps to 16 Avenue, also requires the construction of temporary ramps to the west of 19 Street to connect to the 16 Avenue.
- Stage 4: \$131 million – this stage completes the west facing 19 Street ramps including the two basket weave structures. Also included is the reconstruction of Deerfoot Trail interchange including third level structures along 16 Avenue over Deerfoot Trail.
- Total Staged Cost \$ 205 million. Note the difference between the total recommended plan construction cost (\$203 million) and the total staged cost is attributed to the construction of temporary ramp connections between Stage 3 and Stage 4.

Currently, this project is on the unfunded list within the 2015-2024 Investing in Mobility plan. It should be noted that within Investing in Mobility the project cost have previously been estimated at \$105 million, however the comparable cost based on the current study could see Stages 1, 2 and 3 completed at an estimated cost of \$74 million. The construction of this project can be staged based on the future available funding.

Risk Assessment

Cost estimates for the proposed recommendations are based on the prevailing land and construction costs. The estimates for ultimate horizon should be reviewed if the construction funding will only be available in the future.

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REASON(S) FOR RECOMMENDATION(S):

The recommended plan will not only improve goods movement, but also improve the accessibility and connectivity to pedestrian, cyclist, and public transit. Once build-out, the improvements have potential to reduce greenhouse gas emissions and improve safety. Based on the public engagement result, the majority of the respondents support the recommended plan. The objectives of this study are in alignment with The City's CTP and MDP. The improvements will help The City to achieve the targets set in Calgary Community Greenhouse Gas Reduction Plan as well.

ATTACHMENT(S)

1. Functional Planning Study 16 Avenue North & 19 Street East Interchange Executive Summary
2. Right-of-Way Requirements
3. Potential Surplus Right-of-Way