

**16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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**EXECUTIVE SUMMARY**

This report outlines the functional planning study that was completed for 16 Avenue NE between Deerfoot Trail and Barlow Trail, including the new interchange at 19 Street NE. This report is supplemental to report TT2014-0582 which was referred back to the Administration for further consultation with the public. In response to this referral, Transportation Planning with the assistance of the consulting firm Parsons conducted further public engagement. A total of three additional open houses were held in February and March, 2015. The project name was also changed to "16 Avenue NE – Deerfoot Tr. to Barlow Tr. Functional Planning Study" to better convey the project scope of work.

The study considered numerous interchange options. The project team developed evaluation criteria to compare all alternatives. 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.

The total capital cost of the recommended plan is estimated at \$ 201 million, therefore the project team created staging plans as well as short term solutions. The recommended staging plans are included in Attachment 1. This project is unfunded in the current 2015-2024 Investing in Mobility Plan. It is a high priority for the next period.

**ADMINISTRATION RECOMMENDATION(S)**

That the SPC on Transportation and Transit recommends that Council:

1. Approve the 16 Avenue NE – Deerfoot Tr. to Barlow Tr. Functional Planning Study as summarized in 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, funded using the Transportation Infrastructure future land account or similar appropriate funding sources; 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.

**RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED  
2015 MAY 20:**

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That the Administration Recommendations contained in Report TT2015-0224 be approved.

Opposition to Recommendations:

Opposed: R. Jones

**PREVIOUS COUNCIL DIRECTION / POLICY**

At the November 17, 2014 regular meeting of Council, Council referred report: TT2014-0582 16 Avenue/19 Street NE Interchange Functional Planning Study back to the Administration: "for further consultation with the public for a report to Council, through the SPC on Transportation and Transit, no later than 2015 April".

## **16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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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, with an estimated project cost of \$105 million.

### **BACKGROUND**

16 Avenue NE is an important road in the city transportation network and serves as part of the Trans Canada Highway. It is classified as a skeletal road and is a goods movement corridor. 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 of which the percentage of truck is about 4.2%. Based on the existing available information, 16 Avenue and 19 Street intersection has received fourteen 311 calls per year on 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 along this stretch of 16 Avenue; the Trans Canada Highway – East Functional Planning Study (1978), the Barlow Trail North Functional Study (1986), and the Deerfoot Trail Corridor Study (1998).

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 (1978) 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.

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.

None of these studies made a specific design recommendation for Council’s approval at 19 Street and 16 Avenue.

### **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 a functional design of the

## **16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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preferred solution. Approval of a functional plan would then facilitate land assembly on an opportunity basis and a refined cost estimate for the next iteration of Investing in Mobility.

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 September 11, 2013, where feedback was solicited. After incorporating 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 of the final four short listed options. 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 E18 include:

- Modified split diamond interchange along 16 Avenue at 19 Street and at Barlow Trail, with a tight diamond configuration at 19 Street;
- Modified six lane cross section on 19 Street overpass with 3.5m wide multi-use pathway on both sides of the bridge;
- Lowered the steepness of grade on 16 Avenue by passing 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;
- Large radii exclusive right-turn lanes provided at all of the Barlow Trail interchange ramp terminal intersections have also been included;
- Through lanes on 16 Avenue on a 3<sup>rd</sup> level structure located over the existing Deerfoot Trail interchange in the ultimate stage;
- 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.

The recommended new pathways and bikeways will provide linkages between facilities in areas that were previously not served, or underserved, for active transportation. New 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 (except on the bridge) have been included on 19 Street to

## **16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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improve bicycle connectivity between communities north and south of 16 Avenue. Cyclists and pedestrians share a mixed use space on the bridge to reduce costs. Transit exchanges for the future North Crosstown Bus Rapid Transit at 19 Street have also been provided.

The recommended improvements directly impact one landowner. The total impacted area is estimated as 0.19ha. 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 were completed as part of this study, 4.56ha of land that could be made available for possible redevelopment 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 participation from communities and key stakeholders and gained valuable input that fed into the decision making process. A total of 436 people attended the open houses, information session, completed online surveys, and attended stakeholder meetings and workshops.

In total, six public open houses and two external stakeholder meetings were held. The first stakeholder meeting was held on April 30, 2013 at 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 May 22, 2013 at Crossroads Community Association. A total of 117 people attended it onsite. 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 September 11, 2013 at 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.

A total of 60 people attended the second open house that was held on December 4, 2013 at 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 public information session on March 13, 2014 at 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

## **16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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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.

Following Council's direction, three additional open houses were held in Pineridge, Rundle and Mayland Heights to collect public's inputs on the proposed new interchange configurations at Deerfoot Trail, 19 Street NE, and Barlow Trail along 16 Avenue NE, along with the modified 19 Street cross section and right turn lanes at Barlow Trail. A total of 89 people attended the open house on February 19, 2015 at Village Square Leisure Centre in Pineridge. Only 11 people attended the open house on February 25, 2015 at St. Rupert School in Rundle.

The last public informational session was held on March 10, 2015 at Crossroads Community Association in Mayland Heights. A total of 57 people attended it. The purpose of these three open houses was to present the updated recommended plan and the changes to Deerfoot Trail interchange and Barlow Trail interchange, 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.

In summary, most respondents from the 2015 engagement said the information presented in the open houses met their expectations and the majority of attendees supported 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 2020 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.

### **Social, Environmental, Economic (External)**

The recommended improvements were estimated to reduce the network travel time in a total of 1,593 hours (12% reduction to overall intersection travel time) 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 be reduced 0.79% based on the existing traffic volumes and be reduced 0.01% in the year of 2039 compared to existing traffic conditions, thus no net increase in GHG emission with the growth in future traffic. The recommended improvements are in alignment with the Calgary Community

## **16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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Greenhouse Gas Reduction Plan. The recommended plan will improve auto and goods movement, and improve the connectivity and accessibility for all transportation modes, including pedestrians, cyclists and public transit.

### **Financial Capacity**

#### **Current and Future Operating Budget:**

The operating budget will be higher than current costs as a result of the additional infrastructure. The additional operating cost of the proposed upgrades has not been quantified.

#### **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 \$201 million. The recommended plan was reviewed with respect to a number of key issues to develop a possible staging strategy 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 E22 of Attachment 1 and Attachment 4:

- Stage 1: \$12 million - 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: \$23 million – includes completion of the north half of the Barlow Trail interchange and the property acquisition.
- Stage 3: \$37 million – includes the construction of 19 Street overpass and interchange ramps to 16 Avenue, and 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 \$ 203 million. Note the difference between the total recommended plan construction cost (\$201 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 (IIM) the project cost was 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 \$72 million. The construction timing of this project will be evaluated as part of future IIM updates.

### **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.

**16 AVENUE NE - DEERFOOT TR TO BARLOW TR FUNCTIONAL PLANNING STUDY**

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**REASON(S) FOR RECOMMENDATION(S):**

The recommended plan will improve auto and goods movement, and improve the accessibility and connectivity for pedestrians, cyclists, and public transit. Once build-out, the improvements have potential to reduce greenhouse gas emissions and improve safety. Based on public engagement results, 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 also help The City achieve the targets set in the Calgary Community Greenhouse Gas Reduction Plan.

**ATTACHMENT(S)**

1. 16 Avenue NE – Deerfoot Trail to Barlow Trail Functional Planning Study Executive Summary
2. Right-of-Way Requirements
3. Potential Surplus Right-of-Way
4. Staging Plans