

Minimum Grid for Physically Separated Bike Lane Infrastructure

Recommendation:

That Urban Planning Committee recommend to City Council:

1. That Administration construct the Enhanced design treatment option of the bicycle network as described in Attachment 1 of the September 28, 2016, Sustainable Development report CR_3890
2. That capital funding for the bicycle network be advanced through Approval Option _____, as described in Attachment 10 of the September 28, 2016, Sustainable Development report CR_3890
3. That Administration provide periodic updates on the implementation of physically separated bike lane infrastructure through the City Council initiative on Active Transportation.

Report Summary

This report responds to the July 12, 2016, City Council motion to report on the feasibility of a minimum grid for physically separated bicycle lane infrastructure within the Downtown portion of the core neighbourhoods. Information related to the implementation of this grid is discussed in this report.

Previous Council/Committee Action

At the July 12, 2016, City Council meeting, the following motion was passed:

That Administration, in partnership with Stantec, provide an updated report on a minimum grid for physically separated bike lane infrastructure in the City of Edmonton's core and the report should include the potential use of relatively inexpensive (within existing resources) temporary infrastructure (example: bollards, mobile concrete curbs), as can be found in the City of Calgary's pilot project.

Report

Many cities across the world have identified bicycling as an important element of their overall approach to land use and transportation planning, and to building a livable city. Edmonton's Bicycle Transportation Plan (2009) envisions Edmonton as a bicycle friendly city (and connected region) where more people cycle more often. To achieve this vision, the Plan, like those of many other cities, identifies conditions for a successful shift to bicycling. For Edmonton these include:

- Create a bicycling network
- Coordinate bike planning and infrastructure investment
- Provide end-of-trip facilities
- Integrate bicycle and transit facilities

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- Mitigate construction impact on the network
- Sign the network
- Maintain the network
- Communication and education
- Leverage partnerships
- Promote workplace integration
- Promote tourism aspect of cycling
- Monitor the network

A minimum grid is a distributed network of bike lane infrastructure that provides bicycle access to destinations of different scales along roads and other facilities of differing capacities and attributes. To accommodate the wide-ranging skills of bicycle users, Edmonton's Bicycle Transportation Plan envisions a minimum grid based on a two-level system: a city-wide system and a connector system.

The city-wide system is the basic framework for the network that should be designed to a higher quality to accommodate:

- higher volumes of cyclists - typically along higher order roads
- cyclists that are destination oriented (employment nodes, community nodes, institutions, transit nodes)
- cyclists with a moderate to high level of skill

The connector system is a fundamental component of the overall network and should be designed to accommodate:

- moderate to high volumes of bicycle use - typically on lower order roads
- links within neighborhoods, as well as links integrated with the city-wide system
- access to neighbourhood destinations, points of interest, and local recreational opportunities
- cyclists with low to moderate level of skill

Early implementation of the Bicycle Transportation Plan focused on expanding the network as much as possible by stretching planning and infrastructure investment. Separated or protected bike lanes were not identified as a design option and were not pursued. From this approach, Administration learned that delivering a quality planning process and quality cycling infrastructure was key to gaining community acceptance for implementing the Plan. This understanding was supplemented by survey work to identify gaps in process and outcomes. Important considerations for stakeholders were user safety and minimizing/mitigating impacts on pedestrians, motorists, and property and business owners.

A separated bike lane is also referred to as a "cycle track". These facilities provide space for the exclusive, or primary, use by bicyclists, and are separated from vehicle travel lanes, parking aisles, and sidewalks. Cycle tracks may be one way, or two way and can be at street level, sidewalk level, or at an intermediate level. When at the sidewalk level they may be separated by a curb, street furniture or trees, and demarcated by different pavement treatments, colours and markings. When at the street

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level they may be separated by fixed medians, movable temporary barriers, bollards, vehicle parking and also demarcated by different pavement treatments, colours and markings. Cycle tracks are well signed, can be identified as part of a route network, and the movements of cyclists may be coordinated and protected from vehicle traffic at intersections by signals and other infrastructure. Cycle tracks are the highest quality bicycling infrastructure and are deployed to:

- provide a safer environment for cyclists
- encourage more cycling
- support a healthy lifestyle
- reduce pollution
- enhance mode choice
- relieve congestion

Edmonton's core area contains a high number of residents, jobs, amenities and city-wide and neighbourhood level destinations. As with many cities its age, Edmonton's core is based on a relatively fine grained grid pattern of roads that is largely designed for motor vehicles, including on-street parking and loading space. As such, Edmonton's core is an area of both great opportunity and significant challenge for integrating the movements of pedestrians, cyclists, and motorists.

The opportunity for more bicycle use is based on the interest of existing and potential commuter cyclists for whom Downtown is a destination (e.g., employment hub); and people residing adjacent to, or within Downtown for whom mobility through active modes is a consideration in choosing to live in the core. The challenge in providing more cycling opportunity Downtown is making it safe for users, minimizing/mitigating the impacts of cycling infrastructure on pedestrians, motorists, property and business owners, and managing capital and ongoing operating and maintenance costs. To leverage this opportunity and meet the associated challenge, other cities are piloting and installing a grid of protected bike lanes in core areas as a priority expenditure in achieving mode shift. Calgary, Ottawa, Montreal, and Vancouver are among those cities.

Calgary's Pilot Downtown Cycling Network

After approximately 18 months of planning, 6.5 kilometres of protected bike lanes were constructed in downtown Calgary in 2014. While a budget of \$7,500,000 was authorized, the final cost of the project was \$5,300,000. Initial monitoring indicates that weekday cycling trips have increased by 95 percent, the proportion of trips by women cyclists have increased, and 64 percent of surveyed Calgarians support the network.

Stantec Downtown Edmonton Bicycle Grid Feasibility Study Overview

Feasibility Study Summary (see Attachment 1)

The Stantec study:

- evaluates the feasibility of cycling routes in downtown Edmonton to safely accommodate cyclists ages 8 to 80

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- identifies possible road cross sections and intersection configurations to accommodate bike lanes and movements
- identifies promising routes and designs for each
- identifies three potential design treatments
- assesses the capital and operating costs

Assessment Methodology

Administration and Stantec worked together to produce the study. The study methodology was similar to that used in Calgary, and was informed by a number of meetings to learn from Calgary's experience in planning, designing, constructing, operating and monitoring its pilot downtown protected bike lane grid. The factors considered to assess and identify the streets that comprise the proposed grid are summarized below.

- Traffic Operations - impacts to motorists
- Construction Activity - impacts of ongoing construction
- Connection and Continuity - links to bike facilities outside of downtown
- Public Transit - impacts to transit operations
- Parking - impacts to on-street parking and loading
- Pavement Conditions and Timelines - impact of pavement on ride quality and timeline to improve pavement conditions
- Recently Completed Improvements - leveraging recent upgrades to road infrastructure (e.g., 96 Street/The Armature)

Recommended Grid and Cross Section

The recommended grid is comprised of protected bike lanes installed along the 7.1 kilometres of streets (see Attachment 5, Figure 1) and provides easy access to major destinations within downtown and to bicycle commuter routes that connect to downtown. Three (preferred) two-way infrastructure options based on different design treatments are outlined below:

1. Base - plastic flexpost bollards and paint
2. Winter-Friendly - Base plus continuous concrete curb stops
3. Enhanced - Winter-Friendly plus self-watering planters

These design treatment options are illustrated in Attachment 6 and costs are further described in Attachment 7.

Two-way cycle tracks on one side of the roadway (see Attachment 8, Figure 1) were recommended to accommodate as much parking as possible and for ease of snow removal operations. Stantec recommends dedicating 104 Avenue as a shared use path on the north side of the roadway, using existing double sidewalks and/or wider sidewalks. The grid element along 96 Street between Jasper Avenue and 103A Avenue would utilize the recently constructed bicycle friendly streetscaping.

Administration's Evaluation of the Stantec Study

Proposed Network

Overall, the proposed bike network places a bike route within two blocks of most Downtown destinations, and provides cycling opportunities for all ages and abilities to reach these destinations. The feasibility study did not assess connections to the Mechanized River Valley Access project, nor routing along 103 Street between 103 and 104 Avenues as it is privately owned and is not accessible during ICE District development. Administration will review these linkages and provide updates through the Council initiative on Active Transportation.

Design Treatment Options

The Stantec report provides preliminary estimates for the three design options, which Administration has refined as follows;

- Base - the current *Traffic Safety Act* and *Rules of the Road Regulation* require vehicles to park at the edge of a roadway or adjacent to a curb. The definition of "roadway" includes the bikeways. As such, the Base design option will not be considered for routes that propose to have parking next to a bikeway as no curb is installed. This would apply to the following routes: 106 Street, 103 Street, 102 Avenue and 99 Street south of 102 Avenue. The capital cost of this option is estimated at \$6.8 million.
- Winter-Friendly - adds curbing to the base option that is intended to prevent snow/slush/meltwater migrating into the bikeway from the motorway and thereby better ensuring all season operation. This option is estimated at \$7.1 million in capital costs.
- Enhanced - adds self-watering planters to the Winter-Friendly option to provide additional separation from traffic and improves the appearance of the street. The Enhanced option would add a further \$400,000, or six percent, to the Winter-Friendly option for a total capital cost of \$7.5 million.

Administration recommends the Enhanced option as it aligns with, and would accelerate action to meet the objective to improve/enhance the downtown streetscape that in turn contributes to creating a vibrant, accessible and safe public realm within Downtown.

Capital and Operating Cost Estimates

The study capital cost estimates are based on the costs of Calgary's pilot project and those from other cities. Inspection of traffic signal equipment was not conducted as part of Stantec's feasibility study. Study cost estimates did not include bicycle detection technology that allows for real-time optimization of traffic signals. Consequently, additional funding of \$700,000 for project contingency will be required to upgrade and maintain signals. An additional \$200,000 of capital investment is required for snow clearing equipment that is not identified in the feasibility study. These costs have been incorporated into the proposed capital budget (see Attachment 3).

The study operating cost estimates are based on the costs incurred by Calgary. Due to higher average winter temperature and periodic chinooks, Calgary uses more chemicals

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to melt snow and ice resulting in lower snow removal requirements. Based on a different climate, Administration identified additional operating costs to broom cycle tracks, remove snow from cycle tracks, and clear snow from sidewalks adjacent to cycle tracks. These additional costs total \$625,000 annually, reflect a premium level of service, and have been vetted by a third party reviewer. These costs were calculated for an average winter with six major snow events.

Proposed and Alternative Timelines

The Stantec report identifies an implementation schedule that would have the minimum grid complete by June/July 2017. Meeting this timeline would require Council to adopt a non-standard approach to capital funding approval. Approval Option A, the standard approach, would have Council consider a capital funding profile through the Fall 2016 Supplemental Capital Budget Adjustment process and have funding in time to complete the minimum grid by spring 2018. Approval Option B, the non-standard approach to capital funding approval, would have Council consider a capital funding profile at the October 11 City Council meeting and thereby have funding in time to complete the minimum grid by June/July 2017. Approval Option A and Approval Option B are outlined in Attachment 10.

The more aggressive schedule to open the network over a period of four to six weeks in June/July 2017 is illustrated in Figure 2 of Attachment 5. If Council chooses to pursue this option, the timeline would require capital budget approval by City Council at the October 11, 2016, City Council meeting, prior to the regular Fall 2016 Supplemental Capital Budget Adjustment process.

EPCOR Technologies indicates traffic signals construction will require four months to complete and can commence at spring thaw. Approval Option B assumes a mid-March start so the traffic signal construction could be finished in mid-July at the earliest. In order to meet the more aggressive timeline:

- road design and traffic signal construction work must begin in October 2016 and be completed by internal resources to avoid the time incurred through the tender process (estimated at eight weeks) to secure a private contractor
- public consultation for the project must be minimal during the planning, design and construction phase and more robustly pursued as feedback to implementation and responded to through adjustments to the grid.

Impacts to Traffic Operations

Stantec concluded congestion at intersections nearing capacity can be managed by minor signal timing modifications. Of note, 99 Street, between 102 Avenue and 102A Avenue will be converted to one-way operation, consistent with the Valley Line LRT Concept Plan. Administration agrees with this high level analysis.

Impacts to Parking and Loading

Stantec recommends two-way cycle tracks to maintain as much on-street parking as possible. Detailed parking impacts will be reviewed as the design progresses to optimize parking efficiencies. Administration agrees impacts to parking should be

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minimized based on past engagement with motorists, and property and business owners who place a high value on parking and loading spaces.

Impacts on Snow Clearing

Due to the difference in climate, Administration recommends a higher level of service than that identified in the study to ensure the operating success of the bike lanes and the pilot.

Impacts to Administration's Work Program

To accommodate the work associated with the creation of the bicycle network, Administration proposes internal resources be reprioritized as follows:

- The Bicycle Strategy will resume in the fourth quarter of 2017, to create capacity and to incorporate learnings from implementing the Downtown bike grid. The Bicycle Strategy will update guidance on the provision of cycling infrastructure and the promotion of cycling in Edmonton.
- Phase Two of the Engage 106-76 concept planning study for the Pleasantview and Empire Park neighbourhoods will be deferred to the fourth quarter of 2017. This delay would not impact coordination with neighbourhood renewal for the Pleasantview and Empire Park neighbourhoods as construction is planned for 2022.
- Planning and design activities of the following bike facility projects would be deferred and re-evaluated for priority based on the outcomes of the Bicycle Strategy:
 - 106 Street, from Whitemud Drive to 34 Avenue
 - 95 Avenue, from 189 Street to 149 Street
 - 97 Street, from 34 Avenue to 63 Avenue

Next Steps

1. Deliver a downtown bicycle grid network as described in Attachment 1 and Attachment 5, Figure 1, including the following activities:
 - a. Develop a monitoring and evaluation program through the Office of Traffic Safety, and in partnership with the University of Alberta Centre for Smart Transportation as may be possible, to study the impact of the Downtown cycling grid. Tasks will include conducting road safety audits, developing an evaluation framework, and creating a performance dashboard.
 - b. Develop public engagement, communication, and education plans to support the development of a rapidly deployed adaptable Downtown bike network.
2. Develop concepts for cycling connections to the Mechanized River Valley Access project and report back to Council through the Council Initiative on Active Transportation.
3. Develop a feasibility analysis for extending the bike grid to adjacent core neighbourhoods.
4. Develop an updated Bicycle Strategy that reflects learnings from the Downtown bike grid pilot project.

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Policy

- *Vision Zero*
- *Active Transportation Policy C544*
- *Complete Streets Policy C573A*
- *The Way We Move, Edmonton's Transportation Master Plan*
- *Capital City Downtown Plan*
- *Snow and Ice Policy C409J*

Corporate Outcomes

This report contributes to the corporate outcomes “Edmontonians use public transit and active modes of transportation,” “Edmontonians use facilities and services that promote healthy living,” and “Edmonton is a safe city” as the construction of a physically separated Downtown bicycle network promotes the use of bicycling as an active mode of transportation that is safe and healthy.

Risk Assessment

See Attachment 9.

Public Consultation

Public consultation was not undertaken for the Stantec study. Should Council direct Administration to advance the Downtown bike grid network on the more aggressive timeline (see Attachment 10 - Approval Option B), public consultation will take the form of responding to feedback during implementation (to the extent possible) and after the grid is operational upon confirming the need for adjustment through monitoring. By utilizing adaptable infrastructure, the bike grid can be quickly adjusted to respond to community needs, at costs described in the financial implications section of this report.

Budget/Financial Implications

City Council has two options for securing capital funding for the Downtown bicycle grid:

- **Approval Option A**
Administration will advance a capital profile and associated change requests through the Fall 2016 Supplemental Capital Budget Adjustment process. Under this option, Administration anticipates that the grid of physically separated bicycle infrastructure in the Downtown will be complete in the spring of 2018.
- **Approval Option B**
The proposed Capital Profile (Attachment 3) must be considered by City Council at the October 11, 2016 City Council meeting, prior to the Fall 2016 Supplemental Capital Budget Adjustment process. Under this option, Administration anticipates that the grid of physically separated bicycle infrastructure in the Downtown will be complete in June/July of 2017.

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Administration recommends that the Enhanced design treatment option, as described in Attachment 1, be implemented. The capital cost of this project is \$7,527,900 and the estimated annual operating cost is \$625,000. The capital cost are summarized in Attachment 3 to this report, with more details in Attachment 7. Capital funding is proposed through the reallocation of budgets within existing approved capital profiles through change requests and will result in no increase to the 2015-2018 Capital Budget. The requests and related rationale are included in Attachment 2. Capital and operating costs and sources of funds for both Approval Option A and Approval Option B are the same - only project timelines are affected.

If Council approves capital funding for this project, Administration will bring an operating service package for Council's consideration at the Spring 2017 Supplemental Operating Budget Adjustment. Attachment 4 provides a draft of an operating budget service package to address the more aggressive timeline considered in the Stantec study. The estimated operating cost is similar for all three design treatment options; the operating costs for the Enhanced bike lane network will include the minimal cost of watering planters.

Metrics, Targets and Outcomes

A detailed monitoring and analysis plan will be developed as part of the implementation of the Downtown grid and metrics, targets and outcomes will be reported back to Council through the Council initiative on Active Transportation. Opportunities to collaborate on this monitoring program with the University of Alberta Centre for Smart Transportation through the Office of Traffic Safety will be explored in order to determine the impact of the cycle grid on Downtown.

Metrics	<ul style="list-style-type: none">• Number of weekday cyclist trips Downtown• Proportion of female cyclists riding Downtown• Reported number of cyclist-related injuries• Number of positive user experiences and citizens feeling safe cycling Downtown
Targets	<ul style="list-style-type: none">• Increased number of cycle trips beyond 2016 baseline• Increased proportion of female cyclists riding Downtown• Decreased number of cyclist-related reported injuries• Within 6 months, number of reports of positive user experiences are greater than reports of negative user experiences, including feeling safe using the Downtown bike grid
Outcomes	<ul style="list-style-type: none">• Active transportation infrastructure is in place• Buildings, streets, public spaces are attractive and designed to support "connectivity"

Justification of Recommendation:

1. Development of an enhanced adaptable minimum grid of protected bike lanes in Downtown will:
 - Focus investment into a city-building outcome in Edmonton's most significant neighbourhood by supporting active mode choice, enhancing

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- the public realm and increasing vibrancy,
 - Address existing and potential demand for cycling infrastructure that is safe for ages 8 to 80, in an area with a high existing and higher potential future concentration of people, jobs, and destinations
 - Implement a bike network in an area with high motor vehicle volumes such that it integrates with other modes and minimizes impacts on those modes.
2. Constructing a minimum grid of protected bike lanes requires capital funding. This funding can be provided through two different Approval Options, each with distinct project timelines.
 3. Council has recently provided an appropriate avenue for reporting of active transportation issues through the Council initiative on Active Transportation.

Attachments

1. Bicycle Grid for Downtown Edmonton Feasibility Study: Edmonton FastTracks, Stantec, August 16, 2016
2. Downtown Bike Grid Budget Adjustment Change Requests
3. Proposed Capital Profile
4. Operating Budget Considerations
5. Recommended Downtown Bicycle Grid Network and Workplan
6. Sample Infrastructure Options
7. Capital Cost Details for Downtown Bicycle Network Design Treatment Options
8. Sample Two-Way Lane Cross-Sections
9. Risk Assessment
10. Capital Approval Options

Others Reviewing this Report

- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- D. Jones, Deputy City Manager, City Operations
- A. Laughlin, Deputy City Manager, Integrated Infrastructure Systems
- C. Campbell, Deputy City Manager, Communications and Public Engagement