

Terwillegar Drive Improvements

Recommendation

That the October 2, 2018, Integrated Infrastructure Services report CR_5730, be received for information.

Previous Council/Committee Action

At the September 4, 2018, Agenda Review Committee meeting, the October 2, 2018, Integrated Services report CR_5730 was re-routed from the September 10, 2018, Executive Committee meeting to the September 11, 2018, Urban Planning Committee meeting.

At the February 27, 2018 City Council meeting, the following motion was passed:

That Administration:

1. Suspend any public engagement activities regarding the ultimate long term Terwillegar Drive/Whitemud Drive interchange and any roadway modifications that may limit access in the interim.
2. Optimize the concept plan for the Terwillegar corridor between Whitemud Drive and Anthony Henday Drive, including provision for opportunities of mass transit and active transportation.
3. Advance the Preliminary Design for Terwillegar Drive/40 Avenue interchange.
4. Advance the Preliminary Design for an optimized Stage 2 of the Whitemud Drive/Terwillegar Drive interchange, with consideration for reduced design parameters (i.e. design speeds) with the intent of reducing overall complexity and cost.
5. Continue to advance preliminary design on the basis of a number of \$75-100M packages in support of staged completion of the Terwillegar corridor, including full access for Rabbit Hill Road, 23 Avenue, and Haddow Drive.
6. Present a list of potential shared funding opportunities with the provincial and federal government that take advantage of infrastructure and innovation funding.

and bring back a report to Council in third Quarter 2018 summarizing progress on the aforementioned design elements.

Executive Summary

This report addresses City Council's February 27, 2018 motion directing Administration to continue pursuing a planning and design study for Terwillegar Drive.

Currently, Terwillegar Drive experiences traffic congestion during peak periods, particularly at 40 Avenue. This update builds on past studies to develop potential solutions and recommendations to help inform Council in making infrastructure funding decisions.

Administration's approach with this study for Terwillegar Drive was to 1) validate and update the previously approved long-term plans and 2) advance the first stage of design of the 40 Avenue interchange. As part of the validation stage, Administration has identified an expressway configuration as a potential solution that meets Council direction, public input, and technical requirements and offers a more effective cost and schedule solution.

Report

Planning and design of improvements to Terwillegar Drive have been ongoing since 2001. Conceptual planning studies were conducted in 2001, 2007, 2012 and 2014, forming the Council-approved freeway plans which currently exist for the corridor. Attachment 1 includes additional information on the history of planning and design for Terwillegar Drive, including a summary of the recommendations from the various planning studies.

Terwillegar Drive is identified as a freeway in the City's Transportation Master Plan, *The Way We Move*, and is protected as a freeway in the City's Transportation Systems Bylaw 15101. *The Way We Move* also supports prioritized investment in Edmonton's highway connectors, including Terwillegar Drive.

The last significant capital infrastructure investment included the widening of Terwillegar Drive between Rabbit Hill Road to Hadow Drive to four lanes in 2006/2007. There have, however, been other network area improvements over recent years such as Rabbit Hill Road interchange on Anthony Henday Drive, Rabbit Hill Road widening, selective safety, capacity, and operational improvements along Terwillegar Drive, and 119 Street / 23 Avenue widening.

Council passed a motion on February 27, 2018, providing additional direction on how to advance this study. This report provides an update of Administration's progress towards advancing several elements of the planning and design study referred to in the motion.

This report also presents an alternative planning solution being considered for Terwillegar Drive that proposes changing the classification of the corridor into an expressway instead of a freeway. This report shares the intended next steps to fully explore and evaluate the expressway planning solution and to pursue an intentional public engagement process.

Long-Term Planning Solutions

In early 2018, the City evaluated a number of potential updates to the freeway plan in an effort to refine the plan based on technical requirements, public input and Council's direction in the February 27, 2018 motion.

The preferred draft long term freeway plan is presented in Attachment 2. The main elements of this plan include widening Terwillegar Drive to six core lanes (three in each direction), upgrading all current signalized intersections to interchanges, potential premium bus service on the freeway shoulders, and upgrading the Whitemud Drive/Terwillegar Drive and Terwillegar Drive/Anthony Henday Drive interchanges.

The freeway plan poses a number of challenges and limitations from a technical perspective and does not fully meet the vision outlined by Council and feedback from the public. Some of the challenges include:

- Access at Haddow Drive: the current technical standards (freeway design standards) potentially allow for access to Haddow Drive only on the north side.
- Transit accommodation: a freeway classification does not provide appropriate conditions for transit stops directly on the mainline; however, stops on the service roads to provide improved access to adjacent neighbourhoods and shopping areas are possible. Additionally, there is potential for a "transit only" lane on the shoulder without transit stops (i.e., bus-on-shoulder design).
- Active Mode accommodation: a freeway classification does not allow for parallel active mode provisions (sidewalks, trails), and accommodation would be provided east/west across and through the abutting neighbourhoods.

The current high level cost estimate for the full implementation of the freeway plan shown in Attachment 2, including the ultimate Terwillegar Drive/Whitemud Drive and Terwillegar Drive/Anthony Henday Drive interchanges, is approximately \$1.2 billion (concept level estimate +/- 50 percent).

To address some of the limitations of a freeway design, and in response to the feedback from the public and Council, Administration has explored an alternative planning solution in the form of an expressway. An expressway is a high capacity, relatively high speed, limited access roadway. An expressway has a lower design standard than a freeway. As a result, the lower design standard provides for increased access and accommodation of transit and active modes mixed within the corridor, at a lower cost and significantly shorter construction schedule.

The expressway planning solution is presented in Attachment 3. This plan includes widening of Terwillegar Drive to four lanes in each direction, upgrading existing

signalized intersections including consideration of smart signals and ITS solutions, potentially including transit on the fourth lanes in both directions, and a shared-use path on one or both sides of the corridor. The current estimate of the full implementation cost of this solution is \$300 million (concept level estimate +/-50 percent). The expressway option in and of itself does not require the construction of the ultimate interchanges at Terwillegar Drive/Whitemud Drive or Terwillegar Drive/Anthony Henday Drive, although upgrades to those interchanges may be required in the future due to traffic capacity.

The results of the comparison between the freeway and expressway options are presented in Attachment 4 along with additional details about the criteria used for comparison, including cost, operations, transportation network impacts, transit accommodation, active mode accommodation, and community impacts. This comparison was supported by traffic analysis using both 2030 and 2050 planning horizons to explore the operational and network impacts of each solution.

The key findings from Administration's comparison of the two options are outlined below:

- The expressway solution could be delivered for approximately \$300 million, compared to \$1.2 billion for the freeway, while still meeting the expectations from Council and the public regarding access, active mode accommodation, and level of service.
- Roadway users will experience similar levels of congestion and delay in both solutions in the 2030 and 2050 horizons. This is generally the result of capacity restrictions upstream and downstream at Whitemud Drive and Anthony Henday Drive.
- In the 2030 planning horizon, the freeway and expressway will provide a similar travel time between Anthony Henday Drive and Whitemud Drive compared to what exists today, approximately 3 to 4 minutes in both AM and PM peak periods, compared to travel times from 2015.
- By the 2050 horizon, the freeway will have moderately shorter travel time compared to the expressway between Anthony Henday Drive and Whitemud Drive, approximately 3 minutes in the AM peak period and 2 minutes in the PM peak period.
- From the perspective of the overall transportation network, both solutions will accommodate a similar number of daily vehicle traffic volumes.
- The expressway solution will provide the opportunity to include dedicated transit infrastructure and transit stops, but at the cost of reduced capacity for vehicle traffic. Administration has not yet modelled the impacts of a dedicated transit lane against the base expressway solution or current condition, but a dedicated transit lane may reduce vehicle capacity by up to 20 percent compared to the base expressway solution.

- The expressway solution provides opportunities to construct parallel facilities for pedestrians and cyclists, providing an alternative north/south connection in addition to the routes identified in the Bicycle Transportation Plan.

Transit Accommodation on Terwillegar Drive

Accommodating transit on Terwillegar Drive as part of this study depends primarily on plans for transit service in southwest Edmonton. The draft bus network redesign, the first stage of the Transit Strategy implementation, is advancing at the same time as the Terwillegar Drive project. The bus network redesign is expected to include the implementation of a revised transit system in 2020. Administration anticipates that the current plan being considered for 2020 will not include high-capacity, mass transit on Terwillegar Drive.

Although the current draft bus network redesign does not include provision for a continuous north/south transit service along Terwillegar Drive for either the freeway or expressway solution for the 2020 horizon, the Terwillegar Drive project has protected transit for future provision within the corridor. How the infrastructure may be utilized from a bus routing perspective is still subject to further study and development as part of the bus network redesign project and City Plan initiative (where the route starts/ends, direct/express routing between transit nodes, etc.).

Project Staging and Construction Schedules

Administration has developed two potential project staging schedules for Terwillegar Drive, one for each of the following planning scenarios:

- Scenario 1: Terwillegar Drive Upgraded to a Freeway
- Scenario 2: Terwillegar Drive Upgraded to an Expressway

The two scenarios are presented in Attachment 5. Administration developed the project staging considering factors such as capital cost, construction impacts, staging dependencies and coordination with other planned City projects. The primary requirement for the staging assessment was to achieve construction 'packages' with costs between \$75 million and \$100 million, though this could not always be accomplished given project parameters and dependencies.

Based upon initial assessment and a similar level of annual investment, Administration estimates Scenario 1 could take up to 30 years to implement. Should the plans for the long-term interchange configurations at Whitemud Drive/Terwillegar Drive and Anthony Henday Drive / Terwillegar Drive be scaled back (Stages 7 and 8 as noted in Attachment 5), the freeway implementation could be reduced to approximately 20 years and the investment could be reduced significantly. Scenario 2, however, could potentially be constructed within a 10-year timeframe.

Terwillegar Drive/40 Avenue Interchange (Planned Stage 1)

Administration developed three potential options for the planned first stage of improvements to Terwillegar Drive to be consistent with the freeway planning solution. The short spacing between 40 Avenue and Whitemud Drive, in combination with the requirement to maintain all access to/from 40 Avenue and Terwillegar Drive as per Council's direction, increases the complexity, such as traffic signals or bridge structures to accommodate specific traffic movements between the interchange and Whitemud Drive.

These options are presented in Attachment 6, and are as follows:

- Option A: Traffic signal on northbound Terwillegar Drive
- Option B: Basketweave bridge
- Option C: Signalized at-grade basketweave

Attachment 6 also includes projected traffic volumes at the interchange in the 2030 planning horizon.

Administration has conducted an initial comparison of these options using cost, lifespan and community impacts as criteria, as outlined in Attachment 7. The assessment of lifespan of the interchange was supported by traffic analysis using the 2030 and 2050 planning horizons.

The initial comparison suggests that no option addresses all of the criteria in full, and trade-offs in the selection of a preferred option for the 40 Avenue interchange are required. Some initial considerations include:

- Option B is conventional in design and provides the most robust traffic carrying capacity, but is also the most costly at \$110 million dollars and could be perceived to have high level of community impacts (visual and noise) due to the elevation and close proximity of the basketweave bridge to neighbouring properties. The premium for Option B is to accommodate approximately 500 vehicles per day (vpd) to northbound Whitemud from 40 Avenue/Bulyea Road.
- Options A and C are predicted to exceed capacity prematurely (prior to the overall freeway), resulting in congestion similar to what exists today.

Administration has not yet selected a preferred option for this interchange, as the intent is to seek public feedback on these options to further refine the comparison and make a well-informed recommendation.

Stage 2 Terwillegar Drive/Whitemud Drive Interchange (Potential Stage 2)

A preferred draft concept for interim improvements at the Terwillegar Drive/Whitemud Drive interchange is presented in Attachment 8.

Developing options to address the unconventional design of this interchange within a \$75 million - 100 million dollar package posed some challenges. Several high-level concepts were considered but, in each option, Administration determined that any attempt to remove the left-hand entrances and exits would require an improvement in excess of \$100 million that would ultimately become throw-away should the long-term plan ever be constructed.

Accordingly, the recommended plan developed for this interchange does achieve increased capacity of the interchange, with minimum complexity and cost. A detailed traffic analysis is underway for further evaluation and validation of this improvement.

This plan is contingent upon, and requires, investment in widening the Rainbow Valley Bridge as part of this stage which is anticipated to be coordinated with the bridge rehabilitation that is planned in 2023-2026.

Budget Implications and Funding Opportunities

Administration undertook an initial review of funding capacity for Terwillegar Drive improvements, considering both City sources (including debt funding) and shared funding opportunities with provincial and federal levels of government.

Administration's initial review indicates it is likely that funding options for improvements to Terwillegar Drive over the coming capital budget cycles will primarily need to rely on City funding sources. Provincial funding opportunities, such as MSI, will expire in 2021/2022. Federal funding sources are focused on investment in three areas: green, transit and community. It is unlikely Terwillegar Drive improvements will qualify in these areas.

The 2019-2028 Capital Investment Outlook outlines several potential growth infrastructure projects that would be competing with Terwillegar Drive improvements. This report forecasts a gap between available funding and potential growth infrastructure investments, including Terwillegar Drive, and that the City's debt capacity for funding improvements such as the Yellowhead Trail Freeway Conversion and LRT expansion will continue to decrease.

Recent updates to the *Municipal Government Act* include the provision for new funding tools that would allow for the development of an off-site transportation infrastructure levy.

The level of investment required to fully convert Terwillegar Drive to a freeway will be challenging for the City, particularly as this competes with other investment priorities that help achieve Council's strategic goals.

Conclusions and Next Steps

Administration's initial intent with this study for Terwillegar Drive was to validate and update existing Council-approved long-term plans and advance the design of the 40 Avenue interchange. However, through further validation, Administration has identified an expressway configuration as a potential solution that meets Council direction, addressed public input, conforms to technical requirements, and is also a more cost and schedule efficient solution for the City. Administration's initial assessment of the expressway solution, as compared to the freeway, strongly suggests it will provide a similar user experience and a similar net benefit to the overall transportation system, but with greater alignment to Council and public priorities to alleviate congestion quickly and increase opportunities for transit and active modes. The expressway solution is achievable at a substantially lower capital investment and will not in itself require cost prohibitive interchange improvements to the Anthony Henday and Whitemud Drive interchanges.

Research and experience from the development of the Transportation Master Plan, *The Way We Move*, suggests that building additional vehicle capacity creates additional vehicle traffic by attracting vehicles from other routes and generating new users. This 'induced demand' means that a project that addresses traffic challenges by adding vehicle capacity tends to quickly result in the same congestion and delays it was intended to address. The analysis completed in support of this study echoes this finding. While currently approved plans for Terwillegar Drive outline future upgrades to a freeway, the expressway planning solution has the potential to better balance vehicular travel with other needs and priorities in the area, including improvements to transit and active modes which may help to address the overall volume of vehicle traffic. This contributes to Council's corporate outcomes and closely aligns with the objectives from the City's Transportation Master Plan, *The Way We Move*, of integrating transportation and land use planning, supporting the use of public transit, and supporting a walkable, bikeable City.

Administration plans to advance the expressway planning solution for Terwillegar Drive as an alternative to the freeway planning solution. Developing an expressway solution requires further technical assessment, with consideration of public input from area residents and stakeholders in accordance with the City's Public Engagement Policy C593. Accordingly, Administration has developed a revised study approach to fully evaluate the expressway solution that will support an informed decision on the long-term plan for Terwillegar Drive and include an understanding of the priorities and perspectives of the public.

Administration's next steps are proposed as follows:

- **Public Engagement on the Freeway and Expressway Planning Solutions (November 2018):** Gather input and perspectives from area communities, residents, businesses and the general public to support an informed decision for the long-term plan for Terwillegar Drive.
- **Report back to Committee (Approximately February 2019):** Administration will make a recommendation to Council on the long-term planning solution for Terwillegar Drive, either expressway or freeway.
- **Public Engagement on the Long-Term Vision (March 2019 - June 2019):** Administration will advance public engagement on either the long-term expressway vision for Terwillegar Drive, or alternatively continue with planned engagement on design options for the 40 Avenue interchange.

Public Engagement

Administration conducted public engagement for this study from November 2017 through to February 2018. As directed by Council, further engagement on the project has been suspended. The purpose of engagement conducted prior to the Council motion was to:

- Gather priorities and perspectives from area communities, residents, stakeholders, commuters and the general public for the City to consider in the validation and updating of the freeway plan for Terwillegar Drive; and
- Gather priorities and perspectives on potential design upgrades to the Terwillegar Drive concept plan, including several high-level freeway configuration solutions and interchange design options.

To obtain this feedback, Administration met with area Community Leagues and businesses, hosted a public event on January 24, 2018, conducted an online survey and received several hundred emails from area residents. The key themes from this engagement include the following:

- Alleviate congestion
- Maintain all current direct access to Terwillegar Drive, including at 40 Avenue and Haddow Drive
- Minimize traffic diverted through area neighbourhoods
- Improve accommodation of transit and active modes
- Minimize noise and safety issues

Additional details of the public engagement activities, participation and key themes are presented in Attachment 9.

The input received through this engagement has been considered in the development of the preferred freeway plan, and led to adjustments of the 40 Avenue and Haddow Drive interchanges. This input also contributed to Administration identifying the

expressway planning solution and informed Administration's initial comparison between the freeway and expressway planning solutions.

Corporate Outcomes and Performance Management

Corporate Outcome(s): Edmonton is attractive and compact			
Outcome (s)	Measure (s)	Results (s)	Targets (s)
Edmonton is attractive and compact	Edmontonians' Assessment: Well designed Attractive City (percent of survey respondents who agree/strongly agree)	53% (2017)	55% (2018)

Corporate Outcome(s): Edmontonians use public transit and active modes of transportation			
Outcome(s)	Measure(s)	Result(s)	Target(s)
Edmontonians use public transit and active modes of transportation	Transit Ridership (rides per capita)	91.6 (2017)	105 (2018)

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 % (2018)
	Travel Time and Reliability for Goods and Services Movement (time in minutes and seconds to drive 10-km 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): The City of Edmonton has sustainable and accessible infrastructure			
Outcome(s)	Measure(s)	Result(s)	Target(s)
The City of Edmonton has sustainable and accessible infrastructure	Edmontonians' Assessment: Access to Amenities and Services that Improve Quality of Life (percent of survey respondents who agree/strongly agree)	68% (2017)	70% (2018)

Attachments

1. Terwillegar Drive Project History
2. Preferred Draft Freeway Plan
3. Expressway Planning Solution
4. Long-Term Planning Solution Assessment
5. Project Schedule
6. 40 Avenue Interchange Options
7. 40 Avenue Interchange Assessment
8. Preferred Draft Concept for Interim Improvements at the Terwillegar Drive/Whitemud Drive Interchange
9. Terwillegar Drive Concept Planning Study - November 2017-February 2018 Public Engagement Summary (July 2018)

Others Reviewing this Report

- R. Kits / S. Padbury, Acting Deputy City Managers, Financial and Corporate Services
- M. Sturgeon, Acting Deputy City Manager, Communications and Engagement
- G. Cebryk, Deputy City Manager, City Operations
- L. McCarthy, Deputy City Manager, Urban Form and Corporate Strategic Development