LRT Line Under 102 Avenue

Recommendation:
That the November 15, 2011, Transportation Services report 2011TS4659 be received for information.

Report Summary

This report provides information on the benefits and challenges of placing the proposed Downtown LRT line underground along 102 Avenue.

Previous Council/Committee Action

At the June 1, 2011, City Council meeting, the following motion was passed:

> That Administration provide a report to Transportation and Infrastructure Committee on the costs, challenges and benefits of putting the LRT line under 102 Avenue.

Report

Constructing the Downtown portion of the Southeast to West LRT underground along 102 Avenue is possible and the following outlines the associated costs, challenges, and benefits. The current approved corridor for the Downtown LRT is along 107 Street (between 104 Avenue and 102 Avenue), then east-west along 102 Avenue into the Quarters and connects to the proposed SE LRT line by a portal/tunnel in the Quarters area.

During the development of the Transportation Master Plan, City Council requested that elements of the LRT Network Plan be incorporated directly into the Transportation Master Plan.

The LRT Network Plan includes a change to adopt an urban style that improves connections between the LRT and city life. Key elements of the urban style LRT system specifically related to the Downtown LRT include:

- Building smaller scale stations that are spaced close together.
- Integrating LRT with the surrounding area by providing better links to a greater number of destinations, and providing more direct transit, pedestrian, and cyclist connections.
- Integrating visual elements that minimize intrusion and maximize openness of space to create a safe environment.
- The LRT would operate with reduced speeds in congested areas, allowing LRT to fit and operate safely in pedestrian-oriented communities with reduced right-of-way and fewer barriers.
- Investing in aesthetics to fit within an urban environment.

<u>Assumptions</u>

In order to assess an underground line along 102 Avenue, the following assumptions were made:

- The western tunnel portal (ramp from underground to surface) would be located west of 109 Street on 104 Avenue and exit on the eastern end of Downtown at Louise McKinney Park. Options were reviewed to locate the western portal further east along the corridor and this would have an impact on station locations.
- The stations identified in the current concept design would be retained at the following locations: 107 Street,

105/106 Street, City Centre, Churchill, and the Quarters.

Costs

- The capital costs for an underground line would be significantly higher than if it is constructed at grade. The current conceptual level estimate for the proposed surface Downtown LRT is approximately $165 million and the underground option would be close to $631 million. Attachment 1 outlines the estimated capital costs of constructing the underground line compared to the surface system. Please note that the underground estimate is also a conceptual estimate using costs from comparative projects.
- There is also an increase in operating costs as underground stations and tunnel sections will have more associated infrastructure. Lighting, ventilation, and safety systems are required in all underground segments while elevators and escalators are required at stations.

Challenges

- One of the biggest challenges by providing an underground system is crossing the existing underground line at Churchill Station. The new station at Churchill would be approximately 26 metres below existing ground in order to pass under the existing station. This not only results in constructability issues, but the depth also results in a less passenger friendly system and becomes more complex to navigate for users and is a considerable distance from the surface.
- An underground line would involve significant construction that would typically require a closure of the street during construction for a two to three-year period. Based on discussions with the construction industry, cut and cover construction would be the most cost effective method to construct the underground stations.
- Based on the costs associated with underground stations some locations, such as the 105/106 Street and Quarters Station, may be difficult to justify based on ridership potential versus the capital costs. The Quarters Station is similar to the Churchill Station as the LRT would be approximately 26 metres deep, resulting in significant construction disruption and capital costs to accommodate the station.

Benefits

- Keeping the LRT underground through the Downtown does remove the portal/tunnel currently proposed east of 96 Street on 102 Avenue which has been identified as a concern for local stakeholders. However, the impact of the portal/tunnel will move to another location, along 104 Avenue near the Grant MacEwan University.
- A benefit of having the LRT underground allows the existing characteristics of 102 Avenue to be maintained. There would be minimal impact to parking and traffic along 102 Avenue with the LRT underground.
- The underground stations could be integrated with the existing below grade pedway network providing improved weather protection for

passengers. This also offers the prospect of integrating more retail opportunities into the stations.

Corporate Outcomes

- Attractive and compact physical design with diverse neighbourhoods, amenities, and public open spaces.
- Citizens use public transit and active modes of transportation.
- The transportation system is integrated, safe, and gives citizens a choice to their mode of movement.

Attachments

1. Conceptual Level Cost Estimate – Downtown LRT Quarters to Grant MacEwan