Report
Staff Report
The Corporation of the City of Brampton
2021-02-03

Date: 2021-01-11

Subject: **Queen Street – Highway 7 BRT Initial Business Case**

Contact: Doug Rieger, Director, Transit Development
doug.rieger@brampton.ca, 905.874.2750 ext. 62349

Report Number: Brampton Transit-2021-148

Recommendations:

1. That the report titled**: Queen Street – Highway 7 BRT, Initial Business Case** to the Committee of Council Meeting of February 3, 2021, be received.

2. That the Metrolinx report titled Brampton Queen Street – York Region Highway 7 (Queen St – Highway 7) BRT Initial Business Case, attached as Appendix 2 be received.

3. That the Council support the conclusions of the Metrolinx Queen St – Highway 7 BRT Initial Business Case report that the following two scenarios, identified as providing greater transit benefits, be carried forward to the Preliminary Design Business Case:

    - Scenario 4: conversion of a traffic lane per direction to median BRT exclusive lanes along the length of the Queen Street – Highway 7 Corridor, except in Downtown Brampton where one traffic lane per direction is converted to a curbside BRT lane, between McMurchy Avenue and Kennedy Road.

    - Scenario 5: median BRT lanes (one per direction) along the length of the Queen Street – Highway 7 Corridor as a result of road widening (retaining the current number of traffic lanes), everywhere except Downtown Brampton (Queen Street between McMurchy Avenue and Kennedy Road) where lane conversion is considered.

4. That the Council authorize staff:
    A. to continue to work with Metrolinx to advance the Queen St – Highway 7 BRT in-development project to the next stage to develop the preliminary design with the associated business case for the corridor.

    B. to continue to work with Metrolinx and Region of Peel, and Region of York to develop the terms of reference of a Memorandum of Understanding for any

required governance framework to administer the project, potential partnerships, subject to Council approval.

5. That a copy of this report be forwarded to Metrolinx.

Overview:

- **The Metrolinx benefits management process contains five decision gates of feasibility, preliminary design, procurement and detailed design, construction & delivery, and in service stages of the project life cycle. Major infrastructure investment decisions by Metrolinx are evaluated through business cases at each gate to successfully proceed to the next stage.**

- **The Queen St - Highway 7 Initial Business Case report confirms the need for rapid transit investments along the Queen St - Hwy 7 corridor and marks the opening of the crucial first gate of the Metrolinx benefits management process.**

- **The report evaluates three BRT infrastructure scenarios in addition to the Business as Usual scenario and identified two namely Scenario 4 and Scenario 5 (described in more detail in this report) as offering greater benefits, and carried forward to develop the scope of the preliminary design business case. Both scenarios contemplate implementation of median BRT lanes except in downtown Brampton where curbside lanes will be considered - Scenario 4 considers conversion of existing lanes, and Scenario 5 considers road widening keeping the existing lanes.**

- **Queen Street rapid transit corridor is a Term of Council priority, designated in the City's Transportation Master Plan, and identified in the 2040 Vision. The Queen Street corridor also forms a part of the 2014 Metrolinx RTP Frequent Rapid Transit Network and is identified as 'in-development' project.**

- **Queen St – Highway 7 BRT is in close proximity to two major transit terminals – the future Downtown Terminal, and Bramalea Terminal. The City is requesting that Metrolinx consider having a direct connection of the BRT Route with these terminals, to offer an immediate and seamless connection between different transit systems and modes.**

- **Metrolinx will be developing the scope work for Preliminary Design Business Case as the next stage of the benefits management process. City staff remain engaged with Metrolinx staff on this important project and topics of discussions include any required governance frame work for project coordination, and infrastructure coordination. This work will also lead to Metrolinx releasing an RFP for the preliminary design,**

environmental project report and the associated business case, in the spring of 2021.

- **Staff is requesting direction to continue to work with Metrolinx on the next stage of the project and if required staff will bring forward any terms of reference or a Memorandum of Understanding for Council approval.**

Background:

The Queen Street is the busiest transit corridor in Brampton having a ridership growth of over 130% from 2010 the year of launch of Züm service. This corridor is also supported by the local transit services. With the City's population and employment projected to grow over the next 25 years, the transportation and transit needs on the corridor will also grow. Added are the demand pressures due to the exceptional growth of Brampton transit ridership over the past decade (160% compared to the population growth of 27%) that has seen a doubling of ridership per capita prior to the COVID-19 situation.

Planning Context

A rapid transit corridor along Queen Street is identified as a Term of Council Priority. The City's Transportation Master Plan recommends bus rapid transit and priority bus service along Queen Street as a key infrastructure element to support the projected transit demand. The Brampton 2040 Vision identifies Queen Street corridor as key spine to support the enhanced rapid transit network in Brampton. The Term of Council Priorities also highlights Queen Street BRT as an example for advancing higher order transit infrastructure to equalize all forms of transportation.

Downtown Brampton is identified as Urban Growth Centre. The Metrolinx 2041 Regional Transportation Plan identifies Queen Street and Highway 7 as part of the frequent rapid transit network, and as a part of the larger transit network in GTHA provides a critical inter-regional transit corridor connecting a number of residential, employment, community, and recreational destinations within Brampton spanning west to east, and with York Region, and beyond.

The Queen St – Highway 7 BRT will help support and advance the City's Transportation Master Plan recommendations of achieving increased transit mode share target and the goal of having 50% of 2041 trips through sustainable modes.

The Region of Peel's Long Range Transportation Plan also calls for an increase in the share of trips made by sustainable modes of transportation, including transit, and denotes Queen Street as a rapid transit corridor, as does the Region's Major Transit Station Area study.

In 2019, the City and Metrolinx consolidated other planning studies into a single Queen St – Highway 7 BRT study led by Metrolinx. The details of the studies consolidation are outlined in a 2019 staff report that updated the status of the Planning for Queen Street – Highway 7 BRT. The new Initial Business Case (IBC) considered the Queen St/.

Highway 7 corridor from Mississauga Road in the west to Helen Street (Vaughan) in the east, connecting with Highway 7 Rapidway the York Region BRT system.

Figure-1 depicts the Queen St – Highway 7 corridor conceptually (approximately 24 km segment) that is under planning by Metrolinx.

Figure-1: Queen Street – Highway 7

<u>Metrolinx Benefits Management Process</u>

Metrolinx follows a benefits-management framework wherein major infrastructure projects are evaluated at stages (also called decision gates) as part of advancing them from planning through preliminary design, detailed-design, and construction, and in-service stages. The evaluation is carried out using business cases for each stage. Approvals are required from the Metrolinx Investment Panel prior to advancing the project from one decision gate to the next.

The 2019 staff report outlines the Metrolinx Benefits management process in more detail, Figure 2 below recaps the decision gates and depicts where the Queen Street rapid transit project currently sits within this process.

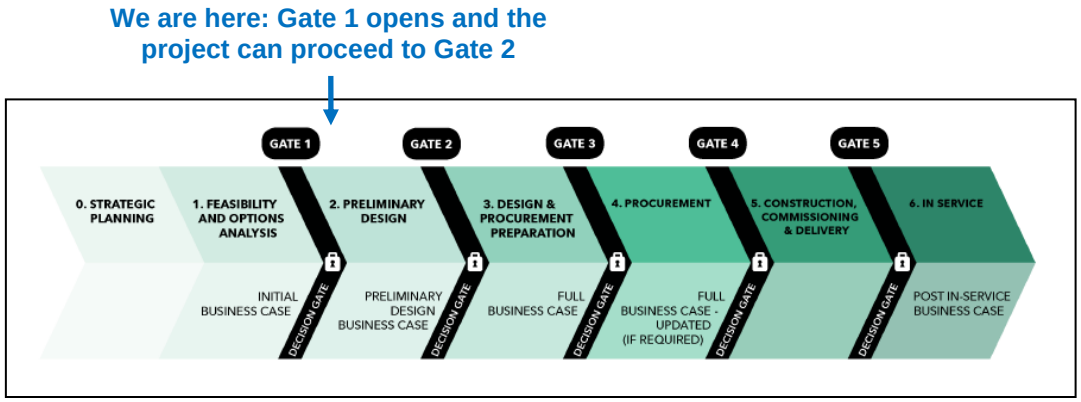

Figure-2: **Metrolinx Benefits Management Process**

In the summer of 2018 Metrolinx initiated the planning and feasibility options analysis as part of the evaluating the Queen St – Highway 7 BRT initial business case, the first step to clearing the decision Gate 1. This business case is carried through a process of evaluation through sub-cases of strategic case, financial case, economic case, and deliverability and operations case to help determine if and which option(s) could advance to the next stage of preliminary design.

In February this year Council passed a resolution requesting Metrolinx to prioritize the Queen St – Highway 7 BRT including advancing the project to the next stage of the Metrolinx benefits management process and procuring the necessary consultant work to support this advancement by fall of 2020.

Study Purpose

The purpose of the Queen St – Highway 7 BRT Initial Business Case is to evaluate planning options under the Metrolinx benefits management process (Figure 2 above) to confirm the need and justification of a BRT corridor and identify options to be carried forward to the next decision gate of Preliminary Design Business Case. The Region of Peel, the Region of York, and the City of Brampton are key stakeholders to this study.

Current Situation:

The Initial Business Case confirmed the need for a BRT route along the Queen St-Highway 7 corridor with priority bus networks and their peak levels of service to maximize the transit ridership in the study area.

BRT Service Scenarios

Three BRT service scenarios (Scenarios 1 to 3) were developed based on the criteria's of transit demand, accessibility, mode share impact, auto travel impacts, and transit level of service to help define the BRT service concepts. The BRT service defined concepts were carried forward for further analysis as Scenarios 4, 5, and 6.

In addition to the Business as Usual (BAU) option, Scenario 4, Scenario 5, and Scenario 6 outlined below were analyzed through the Metrolinx business case process:

Scenario 4	Conversion of a traffic lane per direction to median BRT exclusive lanes along the length of the Queen Street – Highway 7 Corridor, except in Downtown Brampton where one traffic lane per direction is converted to a curbside BRT lane, between McMurchy Avenue and Kennedy Road.
Scenario 5	Median BRT lanes (one per direction) along the length of the Queen Street – Highway 7 Corridor as a result of road widening (retaining the current number of traffic lanes), everywhere except Downtown Brampton (Queen Street between McMurchy Avenue and Kennedy Road) where lane conversion is considered.
Scenario 6	Implementation of two (2) median BRT lanes on the corridor by adding a median BRT lane per direction as a result of widening the road where necessary, except in segments that are in the following constrained zones where a mixed traffic solution is considered. Constrained zones: Downtown Brampton (McMurchy Avenue to Centre Street); Delta Park Boulevard to Sun Pac Boulevard (crossing of CN rail tracks); Highway 410 crossing; Highway 427 crossing; and Kipling Avenue to Islington Avenue

The initial business case evaluated the scenarios through the lenses of a Strategic Case, an Economic Case, a Financial case and an Operations & Deliverability Case.

Highlights from the Queen St – Highway 7 Initial Business Case document are brought forward as Appendix 1, refer:
Appendix 1A for BRT service definition,
Appendix 1B for Scenario 4 roadway configuration,
Appendix 1C for Scenario 5 roadway configuration, and
Appendix 1D for constrained corridor segments

Appendix-2 contains a copy of the full Queen St-Highway 7 BRT Initial Business Case report for reference.

BRT stop type, spacing and, and locations were considered for evaluation purposes only and based on the positioning of the BRT lanes median or curbside operation, minimizing throwaway costs, familiarity with the existing Viva BRT system, less frequent, major stop intersections, and connecting with other transit routes.

Key points from the Initial Business Case sub-cases are outlined hereunder comparing the benefits and costs, and deliverability of for **Scenario 4, Scenario 5, and Scenario 6**:

Strategic Case

	Scenario 4	Scenario 5	Scenario 6
Transit Ridership (AM Peak Hr)	18,813	18,734	15,110
Transit User Experience: Travel time reduction compared to BAU	10 min	9 min	7 min
Mobility Choices	Mode shares - Scenario: 7.1 - BAU: 6.9 Change +4%	Mode shares - Scenario: 7.2 - BAU: 6.9 Change +5%	Mode shares - Scenario: 7.1 - BAU: 6.9 Change +3%
Environmental Quality and Safety	Most considerable improvement	Considerable improvement	Least considerable improvement
Overall Strategic Benefit (additional transportation choices, sustainable growth)	**Greatest improvements**	**Greatest improvements**	**Noticeable improvements**

Economic Case

Cost and Benefits 60 Year Life Cycle	Scenario 4	Scenario 5	Scenario 6
Total Benefits ($2020 NPV)	**$1.96 billion**	**$2.42 billion**	**$1.63 billion**
Costs ($2020 NPV)			
Capital Cost	$95 million	$368 million	$151 million
Operating & Maintenance Costs	$412 million	$375 million	$353 million
Rehab Costs	$78 million	$78 million	$78 million
Total Cost	**$585 million**	**$936 million**	**$582 million**
Benefit-Cost Ratio	**3.3**	**2.6**	**2.8**
Net Present Value	$1.37 billion	$1.48 billion	$1.05 billion
Note: 1 Does not include fleet acquisition, terminal costs – Brampton, Bramalea, financing costs 2 Scenario 5 includes crossings for Hwy 410, CN rail tracks, and Humber River			

Financial Case

Project Costs and Net Present Value, 60 Year Lifecycle	Scenario 4	Scenario 5	Scenario 6
Total Project Costs ($2019, NPV)	$595 million	$946 million	$590 million
Net Present Value ($2019, NPV)	-$381 million	-$ 701 million	-$ 418 million
Financial Impact	**Lowest**	**Highest**	**Medium**

Deliverability and Operations Case

Project Costs and Net Present Value ($2019, NPV)	Scenario 4	Scenario 5	Scenario 6
Physical Constraints • crossings: rail corridor, highways, natural features • narrow right of way segments	Minimal physical constraints during construction process	Considerably high amount of reconstruction of constrained segments	Least amount of reconstruction of constrained segments, but mixed traffic operations high lights operational risks

Vehicle (lane) Capacity constraints	May constrain truck and goods movement	Retains vehicle lanes	May constrain truck and goods movement in constrained segments
Summary	**Highest performer**	**Requires most substantial construction**	**Fewer constraints during construction, congestion issues during operations**

Overall, all three Scenarios perform better than BAU option. Scenario 4 and Scenario 5 offering increased transit reliability and better reduction in travel times compared to Scenario 6. **Scenario 4 and Scenario 5** will **form the basis of the Preliminary Design Business Case**.

ROW width constraints

The Initial Business Case identifies a number of road segments along the corridor that are likely to be constrained for ROW widths compared to the required widths based on the lane configuration linked to the infrastructure Scenario carried forward. As well a number of crossings have been identified that could be required or need to be rebuilt along the corridor. These ROW constraints and crossings will be studied in greater detail during the next stage of preliminary design. Appendix 1D outlines the constrained segments and major crossings for Scenario 4 and Scenario 5 that may need to be investigated further during the preliminary design stage.

Key City considerations

From a policy perspective, Scenario 4 and, to a lesser extent, Scenario 5 are supported by direction in the City's 2040 Vision, Transportation Master Plan, and the Community Energy and Emissions Reduction Plan.

- Brampton 2040 Vision
  The Queen Street BRT helps in achieving the Brampton 2040 Vision of integrated transportation choices and new modes, sustainability, and emphasis on walking, cycling, and transit by adding a higher level of transit service tightly linked to the regional transit network. The Queen Street BRT will help in achieving shorter trips, fewer auto trips, more trips by transit, foot and bike, and more mixed-mode trips.

  The Queen Street BRT will be integral to urban growth and development and will help foster intensification at select station stops (Major Transit Station Areas) along the corridor with the added benefit of acting as a catalyst for mixed use developments.

- Transportation Master Plan
  The Scenario 4 and Scenario 5 being carried forward align with the Transportation Master Plan recommendations of achieving increased transit mode share target and the goal of having 50% of 2041 trips through sustainable modes. The TMP identifies

implementation of higher order transit corridors with Queen Street being one of the identified corridor.

In terms of infrastructure supply interventions to effect mode-shift - replacing a traffic lane in each direction with dedicated BRT lane provides the strongest impetus for mode shift however this could be detrimental from a goods movement perspective as the Queen Street is also a major goods movement corridor. In light of competing objectives, the reduction of vehicle capacity (Scenario 4) versus maintaining (Scenario 5) will be examined in more detail in the next stage of the project.

From the Active Transportation lens the options being advanced shall consider adding sidewalks, pedestrian crossings, and paths where there are gaps in the network.

- Queen Street East - Community Planning Permit System (CPPS)
  In January 2020 Council approved the Queen Street East Precinct Plan to help support the goal of a clearly understood shared vision for future built form and land uses anticipated to help with a quicker market response. The Queen Street East CPPS containing the Queen Street higher order transit corridor forms one of the key infrastructure that the plan is built upon.

- Brampton's Community Energy and Emissions Reduction Plan (CEERP)
  The Queen Street BRT implementation aligns with the CEERP recommendations of reducing greenhouse gas (GHG) emissions by 50% from 2016 levels by 2040. The transportation related GHG reduction is set to be achieved by increasing transit ridership and increased intensification around the transit stops and inducing more walking, cycling, and shared auto trips.

- BRT Corridor in Downtown Brampton (Station Area)
  A number of projects and initiatives are currently underway in the downtown Brampton such as the downtown transit terminal, the CFI project, LRT Extension EA, and the integrated downtown plan (under development), Metrolinx on-corridor infrastructure upgrades along Kitchener corridor, the work related to Downtown Reimagined, and major development applications. Most of these downtown projects and initiatives are under planning stages with a focus around the Brampton GO station area.

  Staff are working with Metrolinx to coordinate the infrastructure planning work and look for potential synergies and future opportunities. Staff plan on engaging with Metrolinx to optimize the opportunities offered by the Queen Street BRT route through the downtown.

  Any ROW constraints in the downtown Brampton will be more defined during the preliminary design stage. The fact that both Scenario 4 and Scenario 5 consider lane conversation between McMurchy Avenue and Kennedy Road helps minimize, if not avoid, additional ROW requirements in this area.

- **BRT Corridor and future Downtown Brampton Terminal, and Bramalea Bus Terminal integration**

  A direct connection (integration) to major Brampton Transit terminals located in close proximity to the Queen St – Highway 7 BRT corridor is of particular interest for the obvious benefits this offers from a customer service and ease of transfer perspective. Although the Queen St – Highway 7 BRT Initial Business Case considered an alignment along Queen Street only, Metrolinx has indicated that the options presented in this IBC will be further refined to establish a preliminary design, benefits of the project as well as a more detailed cost estimate. The development of the Preliminary Design Business Case will include defining of the terminal facilities required or implementing changes to existing facilities in order to support the corridor including the Downtown Brampton Transit Terminal, and the Bramalea (Transit) Terminals.

  Future Downtown Brampton Transit Terminal
  The Brampton Transit bus terminal in downtown Brampton, also referred to as Transit Hub, is an ICIP funded project and staff are developing a strategic implementation plan reviewing the opportunities that could be offered through the colocation of the future Transit Terminal, the future LRT (Extension) terminal, at the GO Rail station forming components of a mobility hub. The Queen Street BRT connection to this mobility hub would be a logical step in integrating the modes for customer service and ridership benefits. However this could require refinement to the BRT route alignment as Queen Street runs approximately 300 meter south of the Brampton GO station.

  Bramalea Transit Terminal
  The Bramalea Transit Terminal at Central Park Drive is located at approximately the midway point on the Queen St – Highway 7 BRT in Brampton. This terminal was opened in fall 2010 in conjunction with the introduction of Züm service along Queen Street and will form another major transit hub in Brampton for the BRT system. The terminal is approximately 150 m to the south of Queen Street and a connection to this terminal with the BRT system also needs to be explored.

  Staff will work with Metrolinx towards optimization of the Queen Street BRT connection including integration with the future Downtown Brampton Terminal, and the Bramalea Transit Terminal that will allow for direct connections between transit systems with shorter transfer times. Staff may request Council's support for the inclusion of the consideration of a corridor alignment that best integrates with the future Downtown Transit Terminal and the Bramalea Transit Terminal in the Preliminary Business Case study to help in discussions with Metrolinx on any refinements to the BRT route.

Next Steps

Metrolinx plans to proceed to the next stage – the Preliminary Design Business Case and Preliminary Design for the Queen Street BRT. A TPAP (Transit project Assessment Process) is anticipated to be completed as part of the preliminary design. The TPAP process required mandatory point of contacts with the stakeholders and public.

As the Queen St – Highway 7 BRT project spans multiple jurisdictions (City of Brampton, Region of Peel, York Region, and Metrolinx) and has linkages to other transportation infrastructure projects along the corridor, this requires coordination and could potentially lead to the development of a governance structure for project administration.

At this time Metrolinx is not requiring the City of Brampton to contribute financially to this project. Staff level discussions are occurring between City and Metrolinx for Brampton's role in the project under Metrolinx leadership, and potential cost contributions to the project if any.

Staff is seeking authority to continue to work with Metrolinx and stakeholders the Region of Peel, and the Region of York to develop the terms of reference including a draft Memorandum of Understanding for any required governance framework for Queen St-Highway 7 BRT project administration, and potential partnerships. If a Memorandum of Understanding is required, staff will bring this forward to Council for approval.

Project Timelines

The timelines for the next phase of the project will be driven by Metrolinx. Metrolinx has indicated that they anticipate to issue the RFP for the Preliminary Design Business Case in the Spring of 2021.

Corporate Implications:

Financial Implications:

There are no immediate financial implications resulting from this report. Potential future financial implications are anticipated based on discussions with Metrolinx towards cost-sharing for the project, and for cost contributions towards municipal infrastructure upgrades or new municipal infrastructure. More details on any potential cost sharing and contributions for municipal infrastructure will emerge through discussions between Metrolinx and City staff as the project advances through the preliminary design phase.

In the 2020 capital budget submission, $2,000,000 was approved for Queen Street Rapid Transit Preliminary Design & TPAP from Mississauga Road to Regional Road 50. Staff will bring forward any additional financial impacts beyond the currently approved budget, subject to Council approval.

Legal Implications:

Legal Services will review and approve as to the form of such agreements, including a Memorandum of Understanding, and any other documents relating to the Queen St – Highway 7 BRT to be executed on behalf of the City pursuant to the delegations as may be authorized by Council.

Term of Council Priorities:

The Queen Street – Highway 7 BRT, Initial Business Case is in alignment with the 2019-2022 Term of Council Priority – Brampton is a Green City – Equalize all forms of transportation. The Queen St – Hwy 7 BRT will provide a key transit link in the regional transit network connecting Brampton to the GTHA.

Conclusion:

Staff recommends that Council support the Scenario 4 and Scenario 5 carried forward towards developing the scope for the Preliminary Design Business Case, with request Metrolinx to consider integration of the major transit terminals (future downtown terminal, and Bramalea transit terminal).

If required, staff will bring forward any terms of reference or a Memorandum of Understanding for Council approval.

Authored by:

Kumar Ranjan, P.Eng
Manager, Higher Order Transit - EA

Reviewed by:

Doug Rieger
Director, Transit Development

Approved by:

Alex Milojevic
General Manager, Transit

Submitted by:

David Barrick
Chief Administrative Officer

Attachments:

Appendix 1 Queen Street – Highway 7 BRT service definitions, roadway configurations, and segments with infrastructure constraints:
Appendix 1A – BRT service definition concepts, Scenarios 4, 5 and 6
Appendix 1B – Roadway configuration, Scenario 4
Appendix 1C – Roadway configuration, Scenario 5
Appendix 1D – Constrained corridor segments

Appendix 2: Queen Street – Highway 7 Bus Rapid Transit, Initial Business Case, Metrolinx, October 2020