

## MEMORANDUM

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Chris Swail, Director, O-Train Planning

TO: Chris Swail, Director, O-Train Planning

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FROM: Charles Wheeler, Deputy Program Manager, CTP2  
Owner's Engineer, O-Train Planning

RE: LRT Extension to Moodie Station: Technical  
Memorandum

DATE: November 8, 2016

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### **LRT Extension to Moodie Station: Technical Memorandum**

#### **Background/TMP Objectives**

The City is currently constructing the West Transitway Extension, a bus rapid transit (BRT) link between Bayshore Station and Moodie Drive with expected revenue service by the end of 2017. The conversion from BRT to LRT in this segment of the rapid transit network is identified within the Ultimate Network of the City's 2013 Transportation Master Plan (TMP), but not affordable if additional City funding was required within the 2031 Affordable Network Concept. There is an opportunity now, to consider the conversion to LRT and include this segment in the upcoming Stage 2 RFP process, if it can be demonstrated to be affordable within the Stage 2 budget.

Stage 2 staff are in the process of preparing an Environmental Assessment (EA) amendment to the West Transitway Extension EA and undertaking preliminary engineering to allow the opportunity to confirm the affordability of an LRT extension to Moodie Station as part of the upcoming Stage 2 Confederation Line procurement process as outlined in more detail in the main Council report.

#### **Purpose of Technical Memorandum**

Given the above, the purpose of this memorandum is to outline, at a high level, the benefits of the LRT extension to Moodie Station for the information of Council. This is not a formal business case but represents the body of knowledge that is available at this time.

#### **Project Description**

The project involves a 2.3 kilometer extension of the Stage 2 LRT system from Bayshore Station to Moodie Station with the addition of one station (Moodie Station). The project would involve the conversion of the BRT extension currently under construction to an LRT link, including the Holly Acres bridge (which was deferred until such time that LRT would be extended) to provide full grade separation of LRT operations consistent with the City's operational requirements. As the LRT extension will largely follow the BRT alignment and the BRT has been designed for eventual conversion to LRT, much of the BRT infrastructure can be repurposed for the LRT extension with the exception of Moodie Station, which is not located or configured for an LRT alignment/station. A bus terminal at Moodie Station would require 8 bus

bays and 14 layby spaces to accommodate the anticipated 2031 feeder bus network including in the most up to date ridership forecasts for 2031 that include the Stage 2 infrastructure.

## **Overview of Project Benefits**

### **1.1 Expanded Rapid Transit Network**

The 2.3 kilometer extension of the LRT network to Moodie Station will extend rapid transit coverage to the Crystal Beach community on the north side of Highway 417 and will locate an LRT station to within approximately 900 metres of the DND complex .The LRT extensions will allow the provision of a short-distance shuttle bus service from Moodie Station to the DND complex compared to a short shuttle to the BRT station at Corkstown and a transfer at the LRT terminal station at Bayshore (or a 3 kilometer bus ride to Bayshore to avoid the BRT transfer at Corkstown).

### **1.2 Reduced Bus Trips**

The Moodie LRT extension will decrease the number of bus trips between Moodie and Bayshore Stations by approximately 650 trips per weekday (200,000 trips annually). These bus trips will be replaced by quiet, electrically powered LRT vehicles.

### **1.3 Feeder Bus Savings**

The operation of the LRT extension to Moodie Station will result in \$12.5 M in feeder bus savings over a 20 year period. In addition, a capital cost savings of \$1.8 m to \$2.7 M will result due to the savings of 2-3 buses and the resulting decrease in fleet requirements. Despite these feeder bus savings, it must be recognized that LRT operational costs to Moodie Station will exceed the feeder bus savings resulting in a net operating cost impact to the City.

### **1.4 Bayshore Station Cost Avoidance/Property Considerations/Development Potential**

With LRT services terminating at Bayshore Station, the existing Bayshore Station bus terminal must be expanded to provide 12 bus bays and 24 bus lay-by spaces. The size of the Bayshore Station bus terminal required if Bayshore is the terminus is larger than the bus terminal included in the Confederation West EA recently approved. An EA amendment to expand the Bayshore Station bus terminal is currently underway and one of the principal impacts of the expanded bus terminal is the need to purchase additional property to the west of the existing bus terminal. The cost to construct the expanded bus terminal and purchase the additional property required can be avoided by extending the LRT to Moodie Station as part of Stage 2. The TOD potential of these lands can be realized more quickly than would be the case if the line terminates at Bayshore Station as an interim stage. Specifically, with the LRT extension to Moodie Station as part of Stage 2, the existing bus terminal at Bayshore Station on City-owned lands will be sufficient for bus operations.

## 1.5 Relationship to Existing BRT Infrastructure Under Construction

As noted previously, Stage 2 staff has confirmed, after a review of the existing BRT design and construction contract, that the vast majority of the BRT infrastructure can be re purposed for LRT operations. No changes to the existing BRT construction project are warranted and the line should proceed to open at the end of 2017 as planned. As the Confederation West DBF contract is not expected to be awarded until Spring/Summer 2018, it is likely that the earliest construction could start on the LRT extension to Moodie Station(if affordable) , following detailed design, is 2020/2021 with revenue service expected in 2023.

## 1.6 Noise and Vibration

The expanded bus terminal outlined in Section 4.5 of this technical memorandum is of concern to the Crystal Beach community to the north of the existing Bayshore Station. Stage 2 staff are currently undertaking a noise and vibration analysis of the expanded bus facilities. The results of this analysis will be shared through public consultation in the coming months, as per the EA process, for both the expanded bus terminal at Bayshore Station (if Bayshore Station is still required as the Stage 2 terminus) and the EA process for the LRT extension to Moodie Station itself. From a Crystal Beach community perspective, the extension to Moodie Station would avoid noise and vibration impacts (if any) from the expanded bus terminal. The bus terminal at Moodie Station would be located farther away from the Crystal Beach community when compared to the Bayshore Station bus terminal. An LRT extension to Moodie Station would trigger a grade separation at Holly Acres for safe and efficient LRT operations, and would result in the proposed Highway 417 noise wall at Holly Acres on the north side of the highway being relocated to the north side of the Holly Acres LRT bridge, to be constructed as part of the Moodie Station LRT extension project.

## 1.7 Proximity to Major Ridership Attractors

The Moodie Station LRT extension would bring an LRT station much closer to the DND complex expected to house 8,500 employees by 2020.

## 1.8 Light Maintenance and Storage Facility(LMSF)

One of the major advantages of the Confederations Line extending to Moodie Station as part of Stage 2 is the opportunity to locate an LMSF facility in the west end of the City to balance the east Belfast MSF facility that will be expanded as part of the Stage 2 construction. The provision of a purpose-built LMSF facility on the Bayshore/Moodie end of the Confederation West project is operationally superior to the proposed Woodroffe MSF site selected as part of the Confederation West EA as well as carrying less capital costs. An LMSF along the revenues service portion of the Moodie Station LRT extension avoids the need to construct a non-revenue connection to the Woodroffe site from Baseline Station with the resulting net capital cost and deadhead mileage savings. Furthermore, if a site can be found for an LMSF on the Moodie LRT extension (or failing that, as part of the Kanata LRT EA west of Moodie Station), the City's interest in the Woodroffe MSF site can be abandoned. Finally, the construction of a westerly

LMSF beyond Bayshore Station will reduce or eliminate the capital cost to provide interim overnight storage and cleaning facilities at Baseline Station that would be required for 2023 revenue service along with the Belfast MSF expansion in the centre-east.

## 1.9 Ridership Forecasts

Ridership forecasts were developed for 2031 for the extension to Moodie Station. Peak point volumes on the Confederation Line (eastbound between Tunney's Pasture and Bayview) increase by about 2 % with an LRT extension to Moodie Station. The combined daily boardings and alightings at Bayshore Station and Moodie Station increase by about 10 % with an LRT extension to Moodie Station taking into account the fact that boarding and alighting at Bayshore Station drops by approximately 70 % with this extension. Daily boardings and alightings at Moodie Station would total 4,900 in 2031, which is comparable to that of Rideau Station (5,300), Tunney's Pasture Station (4,200) and Blair Station (4,100) in 2031.